

**ON THE CUTTING EDGE:
BEST PRACTICES OF
THE WORKER EDUCATION AND TRAINING PROGRAM
NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH
SCIENCES**

April 2001

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EXECUTIVE SUMMARY

The National Institute of Environmental Health Sciences' (NIEHS) Worker Education and Training Program (WETP) is a model training program, bringing together over 90 non-profit organizations throughout the country. Government agencies, community-based organizations, academic institutions, labor unions, and labor-management awardees form training partnerships in all 50 states. The WETP program awardees, working in all 50 states, have delivered more than 12 million contact hours of training to more than a million workers since the program began in FY87.

In meeting the federal training requirements that mandate the existence of the WETP program, the staff and awardees developed cutting edge practices -- training difficult-to-reach populations, addressing issues of literacy, creating appropriate adult education techniques, and continuously improving the quality of training -- all while maintaining the core principals developed by the WETP during its 14 year history. These core values include:

- Small group activities with hands on training
- Peer trainers
- Sharing of experiences and evaluation
- Staying on the cutting edge
- Standards of excellence.

WETP has an effective national framework to develop and provide comprehensive training needed to address the needs of Superfund cleanups, The DOE Nuclear Weapons Complex, chemical emergency response, RCRA corrective actions, and urban communities surrounding Brownfields sites. Keys to success are effective partnerships and collaborations -- among unions, employers, community organizations, municipalities, state and federal government, universities, and unions. As a result of WETP training fewer people have died and fewer have been injured or become ill. Communities and families are safer. Emergency response is stronger. Less property has been damaged.

The Worker Education and Training Program at NIEHS is a resounding success. Staff and trainers are constantly learning from both successes and failures. WETP participants are committed to continued learning, continued growth, and maintaining a keen eye for cutting edge activities that will improve worker training, worker safety, and worker health.

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CHAPTER 1

INTRODUCTION: FOCUS ON CORE VALUES

The NIEHS Worker Education Training Program (WETP) brings together over 90 organizations that provide hazardous waste operations and emergency response training. These organizations are organized through 20 main awardees (See Appendix 1 for a list of awardees and subawardees). Under WETP, Government agencies, community-based organizations, academic institutions, labor unions, and labor-management groups form training partnerships in all 50 states. Funding for WETP is through cooperative agreements between the National Institute of Environmental Health Sciences (NIEHS) and the U.S. Environmental Protection Agency (EPA) and between NIEHS and the U.S. Department of Energy (DOE). Since 1989, more than a million workers have been trained under this program.

Experience led WETP to focus on strengthening the core values central to most of its programs:

- Small group activities with hands on training
- Peer trainers
- Sharing of experiences and evaluation
- Staying on the cutting edge
- Standards of excellence.

These core values were not always apparent or clearly articulated. Through semi-annual awardee meetings and technical workshops, trainers and program administrators share their experiences. Over time it became apparent that model curricula should emphasize small group activities and hands-on exercises, because they significantly enhance learning and retention. As various awardee groups began to utilize peers -- specially trained co-workers or co-tradesmen -- to deliver training, the results were even better. Workers relate well to those who fully understand their work experiences and can be specific, down-to-earth, and practical in thinking through remedies to hazardous situations. Peer trainers are immediately trusted, and the dialog between trainer and trainees flows easily. Evaluation after evaluation, formal and informal, shows that small group activities with hands on exercises, delivered in whole or in part by peer trainers, is the backbone for

quality training. These successes are possible and reproducible when there is a continuous sharing of lessons learned and awardees are given the freedom and encouragement to be on the cutting edge of curricula development and training delivery.

The awardees as a group have reached consensus on these core values. They have met in workshops and codified minimum criteria for hazardous materials training and for peer trainers. Each consortia has its own unique blend of these core values and each has its own model or emerging model. Each has its own successes and experiences, its own lessons learned.

CHAPTER 2

BEST PRACTICES: PROGRAM DESCRIPTION

The Worker Education and Training Program at the National Institute of Environmental Health Sciences provides awards to non-profit organizations that provide model training in hazardous waste operations, emergency response, and related work activities. Not only have program awardees delivered more than 12 million contact hours of training to more than a million workers since the program began in FY87, but each awardee is responsible for developing model curricula. (For a list of approved courses see Appendix 2).

The Superfund Amendments and Reauthorization Act of 1986 (SARA) established an assistance program for training and education of workers engaged in activities related to hazardous waste removal, containment, and emergency response. Grant recipients are non-profit organizations with demonstrated access to appropriate worker populations and experience in implementing and operating worker health and safety education training programs.

Through competitively awarded cooperative agreements, WETP supports the development of curricula and training programs to help employers meet OSHA requirements under 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response (Hazwoper). The model program encourages innovation for training difficult-to-reach populations, addressing issues such as literacy, appropriate adult education techniques, and training quality improvement. The program enhances rather than replaces private sector training responsibility and demonstrates new and cost-effective training techniques and materials.

Administered by NIEHS through an interagency agreement with EPA, this Worker Education and Training Program was initially authorized for five years (FY 87-91). Since then, the EPA-NIEHS program has grown to an allocation of approximately \$25 million for Superfund worker training and \$6 million for Minority Worker and Brownfields job training and placement.

The FY2000 allocation of approximately \$25 million was allocated as follows:¹

1. 17 EPA/HWWTP awardees received awards totaling \$18,277,558.
2. 6 EPA/MWTP awardees received awards totaling \$2,990,000.
3. 4 BMWTP awardees received awards totaling \$3,010,000.
4. 2 SuperJTI awardees received awards totaling \$133,000.
5. 4 Y2K awardees received awards totaling \$400,000.
6. 4 ATT awardees received awards totaling \$390,000.

¹ HWWTP is Hazardous Waste Worker Training Program. MWTP - Minority Worker Training Program. BMWTP - Brownfields Minority Worker Training Program. SuperJTI is Superfund Jobs Training Initiative. ATT is Advanced Training Technologies.

Over the years, WETP expanded to include workers transporting hazardous materials, a Minority Worker Training Program to serve urban young adults, an initiative focused on job training for Brownfields cleanup sites, and a Superfund Jobs Training Initiatives (SuperJTI). In the latter three programs, WETP provides a combination of Hazwoper, construction skills, and life skills training programs to minority workers. In each of these efforts, quality and innovation are a hallmark. The programs provide a gold standard for hazardous materials training and cutting edge work to keep training programs continually improving. The job placement rate for the Minority Worker Training Programs is well over 60 percent.

Over the past ten years Hazmat training programs initiated by unions are stronger and more numerous. Under the aegis of the NIEHS Hazardous Waste Worker Training Grant program, unions now have cadres of peer trainers who are called upon to train both workers and managers in their craft or industry. In meetings and trainers' conferences sponsored by the NIEHS, developers of these programs share successful training techniques and convene to write guidelines for effective worker-based safety and health training. OSHA published some of these guidelines as an appendix to 29 CFR 1910.120.

Through broad-based educational programs, NIEHS awardees and other trainers empower workers so they can be agents of workplace change -- an approach embraced by university labor centers and labor unions alike. The process of building partnerships between employers and employees on health and safety issues has been successful in companies that welcomed this new activism by workers.

Peer trainers play a major role in the new partnerships, as management learns how effectively workers function as trainers, speaking directly to worker interests. The plant manager of a paper facility, where workers (themselves trained by the University of Alabama-Birmingham) have trained over 6,000 hourly and salaried employees, said, "It's easy for management to dream up approaches for such training, but the problem becomes how to get it institutionalized. Any employee-driven program tends to come across with credibility, thus acceptance and effectiveness."

Model Curricula in Support of Training

Each awardee develops curricula to support its program. These curricula are models to help others develop their own effective training. The core courses for the program are the 40-hour Hazardous Waste Operations and Emergency Response (Hazwoper), and the 8-hour Hazwoper refresher course. There are variations on the Hazwoper focus, including 4 and 8-hour awareness courses, 32-hour hazardous materials courses, 80-hour courses, and even courses of more than 100 hours. Additional course themes include: emergency response, asbestos abatement, lead abatement, confined space, hazard communications, radiation communications, life skills, and building trades skills.

The NIEHS awardees conduct courses in all states, and have led the way in developing innovative curricula based on the use of “worker trainers” and hands-on, small group activities. These results have consistently been achieved at a cost lower than most commercially available Hazmat training programs.

The National Clearinghouse for Worker Safety and Health Training houses the curricula developed by awardees. A curricula catalog is available on the World Wide Web. (See Appendix 2.)

The WETP curricula are used, not only by the awardees, but also by other federal agencies, state and local agencies, universities, community groups, and private industry. For example, the Anniston Army Depot in Alabama will be the second facility after Tooele, Utah to incinerate nerve gas chemical weapons. Historically, there are a number of hazardous chemicals used at the depot. In 1992, UAB taught a two-week Hazardous Materials Technician Train-the-Trainer course for selected safety, engineering, and environmental branch employees at the depot. Included in the contract were slides, overhead transparencies, and other aids to use in the training. Depot trainers continue to return to UAB for annual 24-hour refresher training, but they also train new employees and design practice exercises on their own. In 1992, experienced trainers from the Hattiesburg, Mississippi, Emergency Management Agency completed the Hazmat Technician Train-the-Trainer course, and since have used UAB’s manuals and materials for training. The materials also are used at the Hattiesburg Police and Fire Training Academy.

The EPA Program

Congress created WETP to deal with cleanup and emergencies associated with hazardous waste removal, containment, and emergency response, in areas including the highly polluted Superfund sites listed on EPA’s National Priorities List; other public and privately owned contaminated sites; treatment, storage, and disposal facilities, and transportation networks. Many of the workers trained under the interagency agreement between NIEHS and EPA have worked on Superfund sites. Some come into contact with hazardous materials when they transport it from these sites, while others work at RCRA industrial treatment, storage and disposal facilities. Many others are emergency responders.

The DOE Program

Since 1993, a subgroup of the WETP awardees developed specialized training for workers across the Department of Energy’s Nuclear Weapons Complex. Over the six-year period from 1994-1999, these awardees trained nearly 90,000 DOE workers at more than 30 sites within the DOE Complex. The awardees delivered more than 1.4 million training contact hours during this period at an average cost of about \$37 per contact hour. The program continues to grow and keep pace with the emerging DOE needs. Over half the training is core (40-hour) Hazwoper training, reflecting the growing level of activity within the Complex in actual cleanup work execution.

The NIEHS-DOE worker training awardees must maintain the same quality, institutional, and regulatory requirements as the original EPA training grant programs. DOE-specialized training programs have also been developed to assist contractors in meeting unique DOE requirements. Examples include training programs for protection of exposure to radiation, confined spaces, asbestos abatement, and emergency response. Additionally, awardees tailor these training programs to meet specific and unique problems encountered throughout DOE, such as the remediation of mixed waste sites, the decontamination and decommissioning of facilities, the complexity and size of the sites, the inherent need for specialized labor mixes, and the need to train and maintain the training credentials for a large number of workers. The National Defense Authorization Act, Section 3131, administered by DOE, and funds the WETP DOE-specific training program and the training is provided to DOE contractors at no cost to them.

In addition, WETP has provided supplemental awards to DOE-awardees to address DOE-specific needs such as Integrated Safety Management (ISM) training and the application of Advanced Training Technologies (ATT). WETP also participated in and contributed to DOE-specific training conferences such as Training Resources and Data Exchange (TRADE), and conducted research and generated documents to support the efforts of the agency. In 1995, WETP held a series of workshops to develop guidelines to aid those engaged in all aspects of new environmental technology, so that occupational hazards might be averted early in planning and design phases. These workshops resulted in the creation of the document, Anticipating Occupational Hazards of Cleanup Technologies: Remembering the Worker.

The Minority Worker Training Program (MWTP)

The MWTP operates, or has operated, through programs at the Center to Protect Workers' Rights (CPWR), Clark Atlanta University (CAU), DePaul University (DePaul), Jackson State University (JSU), Laborers-AGC Education and Training Fund (Laborers-AGC), the University of Medicine and Dentistry of New Jersey (UMDNJ), and Xavier University. The program recruits young people of color and provides a vigorous training program that leads to employment. Besides delivering hazardous materials courses to minority young adults throughout the country, MWTP helps trainees develop basic life, literacy, and job skills necessary to compete in the labor market. According to data compiled by one awardee, the New Jersey/New York Consortium, wages earned by its trainees equal or exceed the total cost of training. Graduates from 1995-97 earned significant incomes. The earliest graduates earned a median annual income of \$17,215, before benefits, with a maximum of \$44,315. Over the course of two program cycles, students earned a combined pre-benefit total of \$386,000, roughly equal to the total award to the Consortium for a single year of training.

Over the last five years, MWTP has worked in more than 20 cities:

•

- Atlanta, GA
- Baltimore, MD
- Chicago, IL
- Cleveland, OH
- Denver, CO
- East Palo Alto, CA
- Granite City, IL
- Jackson, MS
- Knoxville, TN

- Los Angeles, CA
- New Haven, CT
- Exton, PA
- Indianapolis, IN
- Memphis & Knoxville,
TN
- Minneapolis-St. Paul,
MN
- Newark, NJ

- New Orleans, LA
- New York City, NY
- Oakland, CA
- San Francisco, CA
- Washington, DC

The Superfund Jobs Training Initiative (SuperJTI)

SuperJTI, a project of the Office of Community Involvement for the EPA Superfund Program, partners with WETP to provide training to those living around Superfund sites across the country. Beginning in 1996, the Super JTI program helps to revitalize communities suffering from urban blight and train low-income minority workers for jobs in environmental remediation activities. It recruits workers in communities where there are Superfund sites, provides them with environmental technician training, and then helps them find jobs in the remediation industry. Trainees, residents of the community, and contractors all benefit from the program. The trainees learn skills for new careers while earning wages and participating in rebuilding and revitalizing their communities. The program strengthens the local economic base and helps to cleanup the environment.

The SuperJTI program provides hands-on cognitive thinking skills and environmental training as well as facilitating jobs and career path in the environmental remediation field for minority 18- to 25-year-olds. Upon completion of the training program, students are encouraged to receive state certification for lead, asbestos, and underground storage tank removal. The students also receive a certificate of accomplishment. Through the program, residents:

- Learn new career skills while earning wages
- Upgrade their knowledge of Superfund cleanups
- Participate in rebuilding and revitalizing their communities
- Help build a local economic base
- Participate in community involvement activities
- Increase job skills while restoring the local environment.

Contractors benefit from:

- Hiring trained local workers
- Potentially qualifying for tax incentives
- Building goodwill in the community.

Specific successes of EPA Region 5's SuperJTI program include the provision of yearbooks to program participants, the co-sponsoring of a job fair, and the development of a partnership with DePaul University, which facilitates access to the U.S. Army Corps of Engineers (USACE) and the remediation contractor OHM.

The four steps crucial to the success of any SuperJTI project are building partnerships, recruitment, training, and facilitating employment. A successful SuperJTI effort occurred during late 1997 and early 1998 at the NL Industries/Taracorp Lead Smelter site in Granite City, Illinois. The site had soil and groundwater contamination, a waste pile, and discarded drums containing hazardous materials. DePaul University, through its MWTP, provided overall management and coordination of the effort. The Belleville Area Community College partnered with DePaul to provide life skills training and job readiness instruction. The Venice Lincoln Technical Center assisted in recruiting

and partnered with DePaul in sponsoring a math skills workshop. USACE provided equipment for hands-on training at the site and allowed trainees to “shadow” USACE engineers to gain valuable career exposure. Finally, OHM Remediation Services provided on-site and open space training facilities, encouraged student interaction with remediation workers, and allowed trainees to view remedial activities at the site. After an active recruitment, screening, and enrollment process, 27 community members were enrolled in the SuperJTI program. All 27 students received training in life skills, technical environmental practices, and regulatory overview. The technical environmental training included the 40-hour Hazwoper certification course, lead-based paint abatement training, and on-site training in hazardous waste cleanup procedures. Soon after completing the training, 20 students were hired as recovery technicians, field technicians, and construction workers. The companies that hired the students included ENTACT, Inc., OHM Remediation Services, On-Site Environmental, and ABS Construction. Site cleanup activities included removal, excavation and consolidation of contaminants and soil; capping waste piles; removing drums; installing test wells; and monitoring air and ground water. By April 1999, over 1,100 residential yards were cleaned up as part of the project. The Granite City SuperJTI effort had a profound impact on the lives and outlooks of the trainees, as explained by one trainee:

“Until 43 days ago I had a very negative outlook on life in general. I [now] have a positive attitude...the training will help me accomplish everything in life that I should have accomplished a long time ago. Thank you so much for the opportunity.”

By giving this trainee and others the tools needed to find productive employment, the SuperJTI effort in Granite City helped improve both the economic and environmental conditions of the local community.

The Deep South Center for Environmental Justice at Xavier University developed a SuperJTI in West Dallas, to develop comprehensive educational and job training, to improve general academic skills, and to provide job training in basic construction, hazardous waste removal, and lead and asbestos abatement. A major objective of the project is the development of a partnership for collaboration between the Deep South Center, the New Start Community Organization, the West Dallas Multi-Purpose Center, the West Dallas Neighborhood Development Corporation, and the Laborers-AGC Education and Training Fund.

In North Denver a Successful SuperJTI program involved several communities in North Denver, Colorado -- Elyria, Swansea, and Globeville. North Denver has several large industrial facilities, including four oil refineries, a coal-generated public utility plant, railroad lines, dozens of small businesses, and multiple Superfund sites that could potentially support employment of participants in the SuperJTI effort. The Vasquez/I-70 site, also located in the North Denver area, was preparing for a removal action affecting 19 homes, which could provide employment opportunities if the timing and content of the training was right. The Region 8 Community Involvement Coordinator (CIC) briefed the EPA Remedial Project Manager (RPM) for the Vasquez/I-70 site on the status of the trainees in North Denver so that they would be considered for jobs. Two days after the trainees graduated, the Senior Project Manager for EPA at the Environmental Chemical Corporation (ECC) called the student coordinator to explain that ECC had received a delivery order to begin the removal action at the Vasquez/I-70 site. EPA wanted to hire a local workforce and ECC interviewed ten interested trainees, hiring eight of them at \$20 an hour. The remaining two trainees were not interested in the available positions. As of December 1998, efforts also were being made to hire SuperJTI trainees at Chemical Sales,

another Superfund site in the North Denver area that had recently initiated cleanup. Another round of training was scheduled to build on these initial successes and make SuperJTI a sustainable program in North Denver.

The Brownfields Minority Worker Training Program (BMWTP)

NIEHS is committed to the President's focus on the Brownfields National Action Agenda. NIEHS provides support for Brownfields Minority Worker Training Programs (BMWTP), targeting the Showcase Communities. This initiative adds a new component to MWTP, a program addressing the need for a more comprehensive training program to foster economic and environmental restoration of identified Brownfields sites.

Through the interagency agreement with EPA, NIEHS made awards for the development of environmental job training programs at 11 of 16 Brownfields Showcase Communities. Thirteen MWTP programs operate at Brownfields pilot sites. Locations and the four primary awardees are:

- Center to Protect Workers' Rights: East Palo Alto, California; Los Angeles, California; Salt Lake City, Utah; St. Paul, Minnesota; and Portland, Oregon
- Clark Atlanta University: Eastward Ho, Florida and Dallas, Texas
- DePaul University: Chicago, Illinois; Kansas City, Kansas/Missouri; and Baltimore, Maryland
- Laborers-AGC Education and Training Fund: Lowell, Massachusetts.

On October 12, 2000 the Brownfields initiative received the highest award given to honor those government programs that have best served the public. EPA Administrator Carol Browner said,

"We are highly honored by the Harvard University's recognition of the Clinton-Gore Administration's Brownfields initiative as one of the most outstanding efforts by government to serve Americans. This successful program has provided communities across the nation with financial assistance to clean up contaminated sites, revitalize neighborhoods and create thousands of new jobs. The Brownfields initiative clearly demonstrates that economic prosperity and the protection of public health and the environment go hand-in-hand."

Since its creation, the Brownfields initiative has awarded over 500 grants to communities nationwide, totaling over \$140 million. These grants have resulted in the creation of nearly 7,000 new jobs and leveraged over \$2.3 billion in private investment. Every dollar invested by federal, state and local governments leverages, almost \$2.50 of private investment.

BMWTP: Laborers-AGC Programs:

“Our Minority Worker and Brownfields Minority Worker Training Programs are unique because they are joint efforts - they give us opportunities to team with community groups or with colleges or universities - to bring specialized training to a target audience.”
Program Coordinator, Laborers-AGC Education and Training Fund.

The Laborers-AGC MWTP and BMWTP Programs are successful in promoting worker health and safety in the construction and environmental remediation for people of color who reside in environmentally impacted communities. From 1995 to 2000 the Laborers-AGC MWTP Program trained 297 participants and BMWTP trained 40. Sub-contractors trained over 100 more. Coordination of community support, student improvements in basic skills, and, most importantly, successful job placement encouraged program expansion. In 2000, the five-year competing application to NIEHS expanded both programs to reach a total of eleven different cities. Both programs began September 1, 2000 and will be in effect until August 31, 2005.

Focusing training efforts on the needs of each specific community and leveraging resources has allowed both programs to be uniquely successful. Job placement and job retention boast success rates of 76 percent for the MWTP and 87 percent for the BMWTP. Annual salaries range between \$11,960 to \$48,000. Enhanced local union support and transition into the Construction Craft Laborer Apprenticeship Program are beneficial as a recruitment option. Individual success stories tell how the programs touches the lives of participants and improves their quality of life continue to be the indicator of program accomplishments.

This integrated, comprehensive training targets under and unemployed individuals who lack the exposure, information, and training required for available career opportunities. Unlike other worker training programs, this training is designed to improve basic academic and life skills, promote environmental justice, and also provide training in hazardous waste operations. There are also opportunities to take part in lifelong learning through union affiliation and apprenticeship programs. In the four years, 1995-1999, the Laborers MWTP and its BMWTP trained 347 individuals. Plans in 2000 were for the Laborers-AGC and BMWTP to expand from one to three urban areas and to train 400 community residents who live in or near Brownfields sites.

BMWTP: Clark Atlanta University

In 1999, six women and 13 men were the first Dade County graduates in a program designed to train those living near environmentally contaminated areas, Brownfields, to find jobs in the cleanup process. The Miami-Dade Community Action Agency (CAA), in partnership with Clark Atlanta University, sponsored 12 weeks of training in the removal of hazardous waste and asbestos and lead abatement. Trainees also studied health, safety, math, reading, and basic computer skills. Miami-Dade County Public Schools, Miami Skill Center, South Shore Hospital, and Sal's Asbestos

Abatement Corp. were among the agencies and firms that cooperated in the training. The Corporate Academy in Wynwood and the Carpenter's Union in Allapattah each hosted six weeks of classes. Graduation requirements included 32 hours each of training in lead abatement and asbestos removal and 40 hours in hazardous waste removal.

“I enjoyed every bit of it,” said one Wynwood resident. As a 34-year old single mother of four, she said the training will allow her to give her children a better life. The CAA, which also provides job placement, is helping her find a job. Most of the graduates, whose ages range from 21 to 57, were unemployed, and now expect to earn more than \$8 an hour in the environmental field.

Graduates of the first class are looking forward to a brighter future. “I was making no money an hour; now they tell me I’ll be making \$8.45. I’m happy,” said one Opa-locka resident, who had a job offer from the Carpenter’s Union and considered another from Sal’s Asbestos Abatement Corporation.

Another graduate of Allapattah says he too had two job offers. But was quick to point out that a job is not all he gained. “[The program] has made me aware of all kinds of environment problems. We’re killing the world right now and most of us don’t know it.”

BMWTP: United Brotherhood of Carpenters/Center to Protect Workers Rights²

The United Brotherhood of Carpenters (UBC) Health & Safety Fund’s (now an NIEHS subawardee to CPWR) MWTP is an effective means of creating community collaborations to educate and train residents of environmentally impacted areas. Environmental worker training includes construction skills training with the goal of entry into its regular Department of Labor Bureau of Apprenticeship and Training (DOL/BAT) and state apprenticeship programs. CPWR undertook a project with Bechtel Savannah River Company at the DOE Savannah River Site in Aiken, South Carolina. A collaboration -- of Bechtel Savannah River Company, UBC Local Union 238, the Department of Energy, and the Aiken Public Housing Authority -- led to a joint effort in which career-oriented environmental job opportunities were identified for successful program graduates prior to their entry into the pre-apprenticeship training program. Based upon the number of pre-apprenticeship training graduates, the Bechtel Savannah River Company agreed to employ 3 or 4 of the graduates, while the Aiken Housing Authority, through a Memorandum of Agreement with the Local Carpenters Union #238, planned to hire the remainder of the graduates along with journeymen carpenters to work on rehabilitation of its public housing.

Brownfield Showcase Communities

² On April 4, 1999 the Construction Consortium for Hazardous Waste Worker Training moved from the United Brotherhood of Carpenters and Joiners (UBC), to the Center to Protect Workers’ Rights (CPWR). CPWR is the research arm of the Building and Construction Trades Department (BCTD), AFL-CIO. The Consortium includes seven construction trades unions and several Joint Apprenticeship and Training Centers and community development groups. The Construction Consortium for Hazardous Waste Worker Training includes: The Asbestos Workers, Boilermakers, Ironworkers, Painters, Plasterers/Cement Masons, Roofers, and Sheet Metal Workers.

The Laborers-AGC has two new MWTP geared specifically to redeveloping Brownfield Showcase Communities -- in Lowell, Massachusetts and West Dallas, Texas. In addition to technical training in construction and environmental remediation to people of color who are local residents, both programs include academic skills enhancement, environmental awareness, life skills, job readiness training, counseling services, and placement assistance.

The Lowell program provides participants with the skills necessary to work successfully on or near Brownfield sites and provide a model for other training programs and communities. In Lowell, Laborers-AGC partnered with the University of Massachusetts-Lowell, Coalition for a Better Acre (CBA), Cambodian Mutual Assistance Association (CMAA), and the Lowell Adult Education Center (LAEC). The Lowell program, called Environmental J.O.B.S. (Environmental Justice On Brownfield Sites), is located in the oldest industrial city in the U.S. Lowell, experienced a number of economic setbacks when the textile mills, which were its primary commercial base, closed or moved south during the 1950's. Lowell is a densely populated city containing many abandoned, possibly polluted industrial sites that pose serious environmental threats. The city is rebuilding much of the property that contains hazardous waste, asbestos, or lead.

The new worker training program is unique in a number of ways. Lowell's minority population is primarily Southeast Asian and Latino. (Lowell has the second largest Cambodian population in the U.S.) The program directs itself toward both groups. It has two tracks: a construction track for those who will be involved in hazardous waste, asbestos, or lead cleanup and a track for environmental technicians, who will collect water, soil, and air samples at these sites. Those who graduate from the construction track are eligible to become members of The Laborers' International Union of North America (LIUNA) Local 429, which does most of the cleanup and construction work on Lowell's two major Brownfield projects -- the LaLacheur Baseball Stadium and the Tsongas Arena.

CHAPTER 3

BEST PRACTICES: SMALL GROUP ACTIVITIES WITH HANDS ON TRAINING

The Worker Education and Training Program prides itself on training with small group activities utilizing hands-on techniques. In addition, curricula is organized by modules for maximum flexibility -- thus allowing for craft-specific and site-specific training needs.

Training Through Small Group Activities

One of the hallmarks of NIEHS training is emphasis on small group activities. Hazmat workers seem to learn best by working together and by doing. In small groups, each trainee has an opportunity to question and to share and actively participate in a supportive learning environment. Problem-solving has a chance to be specific to the needs and interests of individual workers. The awardees develop, test, and then share successful activities.

Small-group exercises are an important part of worker education and emphasize learning through action rather than through more passive classroom listening. Small-group exercises allow workers to draw on their experience and share information with others, which generates new confidence, and refines their problem-solving skills. A class divides into small groups (3 to 5 people) who carry out an exercise and report results back to the class. A small-group exercise might be based on a 'trigger' visual that shows health and safety problems at a work place. It might be based on a risk map or specific hazard faced by a trainee at work. The report backs and class-wide discussions are a way to evaluate trainees' competency in a subject. Interactive approaches to learning create an environment for high quality training.

The Midwest Consortium is just one awardee using small-group exercises as performance activities. In one case, a problem is presented, giving details of a hazardous materials emergency incident on a highway. The exercise calls for trainees to identify the Hazmat, assess explosion danger, plan, and then carry out first responder activities.

In a small group problem-solving exercise for hazardous materials safety and health training used by the New England Consortium, trainees explore information available about the physical properties of chemicals. After a brief lecture on how to use the NIOSH Pocket Guide, and learn such technical terms as "vapor pressure" and "flashpoint," trainees form small groups to discuss their responses to a series of questions on a variety of commonly encountered work place chemicals -- often chemicals with which they have experience. They are asked, for example, to use the Pocket Guide to find the vapor pressure of a chemical, then are asked to apply that information to a real work place situation such as entering a confined space. Each group's ideas typically prompt a discussion among class members about the appropriate response. During such an activity, the instructor is more likely to play the role of facilitator, serving as an integrator of knowledge rather than its source.

In 1997 the UAW's health and safety department along with shop level worker-trainers developed a 24-hour Operations Level curriculum based entirely on small group activities. The idea to try this style of curriculum came from evaluators and OCAW, now PACE, and SEIU worker-trainers who use small-group activities based-training. Worker-trainers from each of those programs worked with the UAW to help implement similar curriculum. From 1996 to 1997, seven 24-Hour Operations Level courses were taught using the small group activities curriculum. Future goals include the use of small group activities curriculum in Lockout/Tagout and Confined Space modules and development of Train-the-Trainer courses.

Other examples of small group activities used by the WETP awardees include:

- Exercise in Levels of Protection - to educate participants on the proper EPA-recommended levels of protection as appropriate to a given scenario.
- Hazardous Materials Warning Placards and Label Review Exercise.
- Hazwoper Jeopardy (University of California at Davis) to follow completion of the modules for air monitoring and instrumentation, personal protective equipment, air purifying respirators and supplied air respirators. The intent of the activity is for all the participants to review 15-20 important concepts from the training.
- Hazardous Waste Worker Course "Exam" Refresher Review Exercise (UAB) - to evaluate and reinforce training concepts.
- The Game of Hazardous Waste Life - in which each 'team' of 3 to 5 players represents a hazardous waste worker. The worker must demonstrate his/her knowledge about health and safety on the job in order to successfully (without being killed) get off the work site. The teams must answer oral questions and perform basic hands-on tasks in order to move across the game board.
- Toxic Web Scavenging - a competitive participatory worker safety and health training activity.
- Group resume development.
- Conducting a post training incident exercise analysis and critique.
- Risk mapping exercises.
- A cooperative building activity to engage participants in situations that require group participation. Survival of the whole is dependent on teamwork. In short, there must be cooperative building in order to reach and achieve a desired goal. It is also important that all team members take part in the decision making process.
- Cultural Bingo, a life skills assessment exercise.
- Job Hazard Analyses as a Tool to Develop Tailgate/Toolbox Safety Sessions are developed by the workers themselves, and can be powerful empowerment tools through increasing the awareness and understanding of hazards at work.

Hands-On and Interactive Activities

Hands-on, interactive lesson plans for Hazmat training courses are used by the awardees and are frequently shared with consortium members, other awardees, and trainers more generally. Within the California-Arizona Consortium, for example, LOHP at UC-Berkeley uses small spill incidents, asking if the trainees know the substance. They also use flash cards when describing the scenario. UC-Davis uses a bingo game for its Hazwoper refresher. Arizona State University, after going over the objectives of the training, learns of the experiences of the trainees to better focus on class presentation. At UCLA's Labor Occupational Safety and Health Program (LOSH), a needs

assessment questionnaire is sent to trainees before class and the results passed on to LOSH instructors. Below are a few examples of hands-on and interactive activities that some of the awardees employ in their training:

- Trainers Challenge Game: “Beam Me Up Scotty.” Interactive group activity designed to explore ideas for resolving ‘tricky’ training challenges that make a trainer want to get ‘magically transported’ out of the situation.
- Interactive Methods to Educate About Brownfields. This exercise gives participants insight into Brownfields redevelopment including the history, current legislative efforts, and participatory activity involving a scenario.

According to one SEIU trainee hands-on training is an excellent training tool:

“The part I liked best about the training, this training, in comparison to others is we had more hands-on work. You just don’t sit at a table all day long and have the guy up front either read to ya from a book or show you pictures and show you slides, then when you leave you’re done. You don’t get the same feeling as if you put the thing on, you go down in the hole, try to adjust the monitors, you know, do hands-on work. It’s much more effective I think, in getting the point across.”

Ability to Focus on Craft-Specific Training

So that instructors, employers, or unions can most easily develop separate craft-specific training, much of the WETP curricula is organized into modules. Since nearly all awardees are in consortia with union/labor-management groups, and these organizations are uniquely qualified to develop craft-specific Hazmat training, the curricula is particularly effective. Craft-specific Hazmat training can save additional lives by focusing on training specifically and pragmatically useful to those being trained. Many injuries and fatalities at hazardous waste cleanup and disposal sites are related to specific craft expertise -- including welding, working with high pressure valves, creating forms for laying foundations, operating heavy equipment, sampling and testing hazardous materials. While there clearly are common necessary elements to training, some specialization of courses makes them more effective.

Focus on Site-Specific Training

The module format allows for site-specific training beyond the regulatory requirements, especially where individuals in a class, are from the same work site. Such specialization makes training more relevant as well as more strategic. Trainees, in class, sometimes do risk maps of their specific work sites, and then may be able to bring about work practice changes on their return to work. There are examples of firefighters using a specific local site as a case study during training, and then actually facing an emergency on that site and being especially well prepared.

Emergency responders are trained under WETP to save lives, contain Hazmat incidents, and protect

themselves and others from danger in a Hazmat disaster. Innovative teaching techniques and course materials developed under NIEHS grants are used by trainers across the country -- to train paid professional emergency responders, volunteer emergency responders, workers with collateral duties in emergency response, and first responders.

On February 24, 1997, a fire broke out at a metal company in Toledo, Ohio, when a hose broke, spilling hydraulic fluid over red-hot steel bars and high voltage equipment. The workers had been trained by the United Auto Workers International Union. They immediately began to evacuate the plant. "We were very fortunate not to have anybody hurt," said the UAW plant chairman. "It was due to the training, the alarms, and the people's knowledge of how flammable hydraulic fluid is."

According to one SEIU trainee:

"The other factor is that in this program, people actually use their equipment and go into the hole with it, so that when they're done with the training hopefully, they'll actually use the training in their work. And that's the real advantage compared to the training we've had in the past. So, I think from all those aspects, it's really been an exciting and positive program."

Hazmat Training Model Benefits Minority Worker Training Program (MWTP)

The Minority Worker Training Programs (MWTP) provide hazardous materials training. They also provide job training. The career development path of trainees engaged in hazardous materials training has evolved since the inception of MWTP in 1995. The primary focus continues to be environmental remediation training. The increased emphasis on careers rather than jobs sharpens the training opportunities to longer-range skill development options. These improvements include entry into apprenticeship programs and collaboration with other specialized skills training such as nuclear worker and environmental technician training. In particular, many awardees opt to call their programs "pre-apprenticeship programs" and tailor each series of training on successful entry of their trainees into certified apprenticeship schools.

Developing Job Skills and Life Skills as Well as Health and Safety Skills Through the Minority Worker Training Program

The Minority Worker Training Program recruits young people of color and provides a vigorous training program leading to productive employment. During the first five years of the program, over 1600 young minority adults completed training in worker health and safety for construction and environmental cleanup. In FY99 alone, 360 students were trained in 18 cities from Atlanta to New York City, from East Palo Alto to Granite City, Illinois. The courses ranged from life skills to environmental technician training. Trainees developed specialized skills leading workers into jobs with an environmental focus. Several awardees simultaneously train their workers in pre-apprenticeship trade union programs.

Instrumental Enrichment Training

DePaul University, in its MWTP, integrates educational and training models that promote rigorous cognitive and affective engagement within the content and process of experience in hazardous waste training. Instrumental Enrichment (IE), developed in the 1950's to develop specific life skills curricula and other deductive reasoning skills, has been used in 70 countries as a tool for the enhancement of learning potential in specially challenged individuals and those in high-risk environments. IE/life skills training places great emphasis on developing interview skills, marketing ones training and skills, and resume development. The Abridging@ back and forth between cognitive principles introduced from the exercises in IE and subject matter elements form a powerful integration of cognitive enhancement and interdisciplinary learning techniques.

Objectives of the IE program are to:

- Help students reduce or eliminate impulsive behavior and their trial-and-error approach to life
- Help students develop within themselves the intrinsic motivation to become proactive learners and critical independent thinkers
- Provide students with the facility to engage in creative thinking and problem solving when dealing with job related, individual, family, and community challenges
- Bring about motivational and attitudinal changes in students' approach to reality by encouraging their application of perceptual processes to develop cognitive strategies for addressing career development and a broad array of situations in life
- Enhance their self-esteem and build their feelings of competence and independence.

IE is credited with reducing the student drop out rate for the program. Students acclaim the IE program as teaching them "how to think."

Training That Creates Career Paths and Businesses

The Minority Worker Training Program, in many instances, finds pre-apprenticeship positions for its trainees, enabling them to join a union and progress through their craft to journeyman status. The New Jersey-New York Consortium has a Pre-Apprenticeship Environmental Worker Training Program. In 1999, it recruited 30 students to begin pre-apprenticeship training. Twenty-four completed the program. Fourteen were immediately employed and nine of the remaining ten students at year end were in the final stages of interviewing to join either the Sheetmetal Workers Union, the stationary engineers, the International Union of Operating Engineers apprentice programs, positions in environmental remediation, or positions in environmental assessment.

DePaul University, in collaboration with ERA Environmental and Full Employment Council in Kansas City, not only trained minority workers, but also helped seven of them form a partnership and incorporate their own environmental business. With work completed, these graduates are on their way as entrepreneurs in the environmental remediation field.

Job Opportunities, Career Enhancement, and Stability with Hazwoper Certification

Upon completion of the 40-hour Hazwoper course, a worker has “one more tool” for applying or bidding for a job. Many jobs require 40-hour training as a prerequisite for entry to the site. For some workers, it is their responsibility to keep their refresher training up to date, and it, like the 40-hour training, may be a prerequisite for job consideration. Job placement rates for MWTP graduates average 65 percent, with some awardees having placement rates as high as 80 percent. Many trainees are paid prevailing wages.

CHAPTER 4

BEST PRACTICES: PEER TRAINERS

One of the most lasting innovations of the WETP program is the full use of peer trainers to deliver courses. Workers appreciate learning from individuals who have similar and real life experiences with hazardous materials, and similar craft backgrounds. Often peer trainers are joined by health or safety professionals, who may offer modules on industrial hygiene or toxicology. But when it comes to learning how to read a Material Safety Data Sheet or decontaminate personal protective equipment or just respecting the fundamental dangers inherent in hazardous materials work, there is no one like a coworker to teach the skills and drive the message home.

More than 1,000 peer trainers provide Hazwoper training courses under the auspices of one of the several NIEHS-supported worker training programs. Approximately two-thirds of these peer trainers are part-time. They work in a range of industries, including petrochemical, transportation, construction, manufacturing, and the public sector. The remainder are full-time trainers, the great bulk of who work in heavy construction. The types of courses offered by these various programs range from basic life skills to advanced pedagogical techniques to 40-hour Hazwoper training.

To ensure the highest quality of training, the NIEHS program provides specialized training for its peer trainers. In fact, the full group of awardees gathered in the late 1990's to develop minimum criteria for peer trainers and to share lessons learned and best practices.

The extensive use of peer trainers in NIEHS-supported programs represents a break with much of established training practice. Peer trainers are experienced with the handling, storage, and transportation of hazardous waste. On average, they have worked for at least 10 years with Hazmats, and have been in the workforce 15 years. Some courses are curriculum-driven, relying on learning materials that anyone can use, with basic training, to deliver a consistently excellent training course. Others seek to provide trainers with enough skills and knowledge to ensure that they offer an excellent course with whatever materials are at hand.

Peer trainers have a high credibility with workers. They build leadership skills and help create a system of worker empowerment in the workforce, and they can often deliver the same training as professionals with emphasis on the most pressing safety issues and at lower cost. Training takes place in the classroom, in break areas, or on the job. By enlisting Hazmat workers as trainers and taking advantage of their practical knowledge and direct experience with dangerous materials and processes, these programs raise the quality of training. Using peer trainers helps make safety a widely accepted shop floor practice.

All the programs require that trainers complete a variety of basic training courses, including courses in adult education and Hazmat safety. Some programs offer annual refresher training. Many

programs provide networks for peer trainers to stay in contact with each other and program administrators some through defined mentoring programs. Many, in addition to providing training, offer peer trainers a large array of supplemental information and materials, from toll-free technical information hot lines to college credit programs, quarterly newsletters, and mentors.

Peer Training: The American Federation of State, County and Municipal Employees (AFSCME) Training and Education Institute has approximately 20 peer trainers, who all train on a part-time basis. Most are employed in the public works and waste treatment industries. The peer trainers offer Hazwoper courses, primarily at the awareness level. The more experienced peer trainers mentor new peer trainers. Train-the-trainer programs combine discussion of adult education techniques, review of the curriculum to be presented, and practice training. After the initial train-the-trainer program, grant staff return to the site to co-train with peer trainers during several training sessions. The on-staff trainers provide peer trainers with support “to get them off the ground,” plus visual aids and updated training materials. Grant staff provides technical assistance to peer trainers on an ongoing basis, as questions arise.

Peer Training: The International Chemical Workers Union Council (ICWUC)/Center for Worker Health & Safety Education in Cincinnati has approximately 170 peer trainers. Eight are full-time trainers, who in addition to ICWUC members, belong to other consortium partners, such as the Machinists, Steelworkers, and American Flint Glass Workers. Members of the Coalition of Black Trade Unionists working with the Environmental Justice network are also involved in the ICWUC program. The peer trainers offer courses in all 1910.120 requirements, including Hazmat, toxicology, respirator protection, and personal protective equipment. Peer trainers all have a strong background in safety and health. They work in the chemical and hazardous waste industry, and in steel, glassware, brick making, and other industrial facilities. Trainers receive an initial four-day Chemical Emergency Response course followed by five days of adult education training. Some also receive refresher training in adult education techniques and they take part in technical skills programs. The refresher programs help trainers sort out problems they may have encountered during their training courses, while the technical skills program gives them a fuller background in technical areas. Central to trainer development and to all center programs are adult education techniques that validate workers’ experiences.

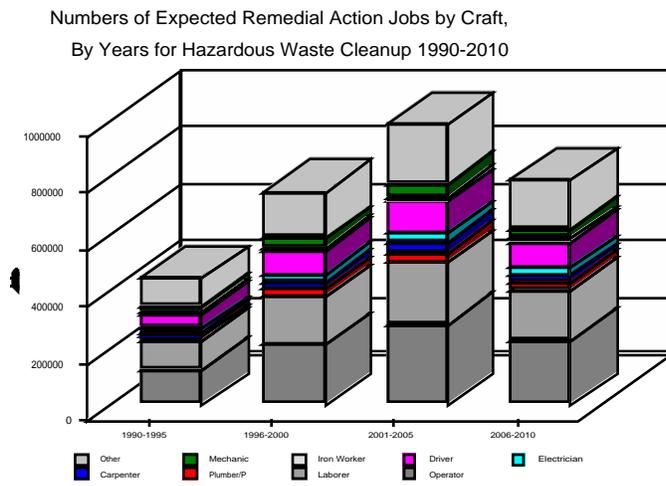
Peer Training: The International Union of Operating Engineers (IUOE) Hazmat Program is one of the largest in North America. There are 280 active peer trainers, many of whom train full-time. They offer courses in Hazwoper 1910.120 certification, as well as confined space, respiratory protection, radiation worker II, and Hazardous Communication (Hazcom). Approximately 30 are directly employed in the hazardous waste industry. These trainers are selected for their Hazmat expertise, and their experience in dealing with government, construction, and industry regulations. They work at jobs that include heavy construction and general industry, building engineering, DOE-related occupations, and jobs in the petrochemical industry. A peer trainer’s formal training

includes an intensive train-the-trainer program, with instruction in methodology and adult education as well as technical aspects of industrial hygiene and toxicology, as well as updates on government regulations, a 40-hour yearly refresher, college credit training, and training that leads to a Bachelor of Arts degree.

Peer Training: The Laborers-AGC Education and Training Fund employs 170 full-time trainers and 150 part-time trainers. The program is approximately 33 percent environmental training and 67 percent construction skills training. The part-time peer trainers work mostly in asbestos abatement and masonry. The trainers offer hundreds of different courses, from asphalt to scaffolding, tunnel, and shaft work. They complete an “Instructor Development Program,” with 44 hours per year of training plus 100 hours of work in the field. Approximately 120 of the peer trainers are certified Hazmat training specialists. With experience, the peer trainers can earn the rank of “master trainer,” after preparing a portfolio of their accomplishments and teaching materials. The peer trainers receive support and training from four program coordinators, who oversee program development at the Laborers-AGC Education and Training Fund. Program specialists at the Fund help with curriculum development, train-the-trainers courses, site monitoring, ordering supplies, and state accreditation. The Laborers-AGC staff provides trainers with curricula, lesson plans, audio-visual aids, adult learning techniques, and technical assistance.

Peer Training: The Paper, Allied-Industrial, Chemical and Energy Worker International Union (PACE) (formerly Oil, Chemical, and Atomic Workers International Union) has approximately 75 trainers, all part-time and all employed in jobs associated with hazardous waste. PACE peer trainers are recommended by their local to the regional director and then to the vice president and

president of the union. All PACE peer trainers complete a 40-hour train-the-trainer course, which combines safety issues and training tips. Senior worker-trainers also mentor new trainers in the field, helping to answer questions and clarify training techniques on the spot. Worker-trainers receive technical assistance from the PACE Health & Safety Department, as well as from the staff and members of the PACE Training Committee. They participate in regular technical workshops and train-the-trainer sessions. Experienced worker-trainers also provide curricula support, serving on committees that oversee the production of all new training materials.



Peer Training: The Railway Workers Hazardous Materials Training Program has 25 peer trainers, all of whom are part-time, and all are employed in the transport of Hazmat by rail. They are railroad car inspectors, serve on repair and wrecking crews, engineers, conductors, and track maintenance personnel. Peer trainers receive one week of training per year in training technique skills and Hazmat transportation principles and rules. They also receive a supplementary four-day Hazmat training. Each year before a training team begins, there is one day of practice and updating.

Peer Training: The Service Employees International Union (SEIU) Education and Support Fund has over 130 peer trainers, all of whom train part-time. They work in a variety of service jobs, including custodians, nurses, state employees, Department of Transportation (DOT) workers, mechanics, and sign shop workers. Each of the SEIU's peer trainers participates in a five-day, 40-hour train-the-trainer program. These peer trainers offer four courses: two eight-hour Hazmat awareness and emergency response courses, one 24-hour confined space course, and one four-hour refresher. The peer trainers usually work in teams of two or four.

Peer Training: The United Auto Workers (UAW) Hazmat Training Program has 15 part-time peer trainers, which they call Local Union Discussion Leaders (LUDLs), who work in stamping plants, door-making plants, auto facilities, lighting and fixture plants, and metal machinery plants. Eleven of the UAW's peer trainers are trained in the Small Group Activity Method. They have formal training that includes a train-the-trainer program specifically designed for teaching the 24-Hour Operations Level Emergency Response course. The peer trainers offer 24-Hour Operations Level I Emergency Response and 8-Hour Hazmat Awareness courses. Some also offer lock-out tag-out training. Plans are to add an 8-Hour Refresher course, as well as training in confined-space entry and Hazcom. The peer trainers are supported by four full-time UAW staff members and professional trainers, who in addition to helping the peer trainers with technical and pedagogical questions, also schedule the courses and make contacts with local unions and companies. In order for the workers to provide the best possible training, they have coaching prior to training, as well as preparation time during which they divide up the sections of the curriculum they will be teaching. The trainers are debriefed after they go through their first training, informally evaluated, and given a chance to talk about their experience.

Peer Training: The Center to Protect Workers' Rights (CPWR) (formerly United Brotherhood of Carpenters and Joiners) has hundreds of active peer trainers, most of whom serve part-time. Only a relatively few of these trainers work full-time in the hazardous waste industry. Almost all are journeymen, and most are also instructors in apprenticeship and training programs. Peer trainers deliver a broad range of safety and health training courses, including 40 courses a year at Hanford alone. All together, the peer trainers provide health and safety training to over 10,000 workers per year. CPWR's trainers receive training consistent with Appendix E of OSHA's final Hazwoper standard (29 CFR 1910.120). They experience training in the role of students before attending train-the-trainer classes for that specific course. The trainers have access to supplemental information and advice via a network of district coordinators, and the program has technical staff that can be contacted as necessary. There is also comprehensive hands-on training and trainers are provided with equipment and materials. In addition to the initial training, trainers return for refresher training and "upgrading." The training program provides the trainers with adult education skills, as well as some technical knowledge in toxicology, occupational safety, legal rights and requirements, chemistry, and industrial hygiene.

Peer Training: The California/Arizona Consortium (CAC) has peer trainers at UCLA and Berkeley. The LOSH program at UCLA has trained 20 part-time peer trainers who have, in turn, trained 327 workers in the metal finishing industry. LOHP at UC (Berkeley) is developing a peer trainer program for 15 Spanish-speaking workers. The primary goal of both the LOSH and LOHP programs is to develop peer trainers who serve as in-house health and safety resources/trainers for their co-workers in small businesses. Steps in developing the Training-of-Trainers (TOT) for these peer trainers include: talking with employers in advance to clarify the role of peer trainers and reach understanding and commitment on what the peer trainers will do; designing TOT curriculum to teach workers how to develop activities and training to meet basic components of the Hazcom standard

(an imperative for many employers and workers in small, hazardous waste generating businesses that employ primarily Spanish-speakers); post-TOT observation, follow-up, feedback, and technical support. Most peer trainers have a high school education and do industrial work; most have some experience in the metal manufacturing field and the metal finishing industry; all work with hazardous wastes.

Through CAC, peer trainers learn the fundamentals of educational training, which include lesson plan development, an introduction to training methods, and information about conducting training in Spanish. Employing bi-lingual training coordinators facilitates this training process. They also receive information on Hazcom, personal protective equipment, and other workplace-relevant issues. Training courses offered include Hazcom for metal finishing, confined space, air monitoring, and 40-hour Hazwoper.

In addition to formal training, peer trainers receive support from the program's technical consultants. There is constant interaction between peer trainers and program staff about training methods and pedagogical techniques. Understanding of the basic tools of participatory education training is an essential ingredient in making their own experiences in the classroom enjoyable. Over time and after some hands-on experience in a non-lecture setting classroom, the peer trainers in this program develop a great deal of confidence. From the beginning, they have the autonomy to design their own courses and to tailor content to their own particular needs.

Peer Training: University of Alabama at Birmingham (UAB). The UAB program is a partnership with PACE (formerly the United Paperworkers International Union) and has 200 peer trainers, almost all of whom work part-time. The trainers work in cement production, papermaking, and a variety of industrial operations. Formal training for UAB trainers includes a series of two-day educational programs with sequential skills building over the course of three years and a supplementary review course after one year of training experience. The peer trainers also complete Hazwoper training courses and pedagogical skills training, particularly in the areas of adult and participatory education methods. Support for the peer trainers includes access to technical materials, subscription to a quarterly newsletter, and extra train-the-trainer training. The program has professionals on staff, who assist the peer trainers with technical questions. The staff includes an educational specialist, an industrial hygienist, a chemist, and one adjunct who is a specialist on confined space. The professional staff develops the courses. Although peer trainers stay in touch with the program's staff and often call from the field with questions and information, the program is still in the process of developing a permanent structure to provide complete evaluation follow-up. One of the peer trainers' greatest needs is to function in an environment without management conflict; the program's goals include creating an atmosphere free of conflict, where peer trainers can function effectively.

CHAPTER 5

BEST PRACTICES: SHARING OF EXPERIENCES AND EVALUATION

A hallmark of the NIEHS program is continual sharing of experiences and evaluation. Awardees share experiences informally and also formally at awardee meetings, technical workshops, special workshops, through trainers' exchanges, and through information dissemination. Evaluation is a key part of each awardees training program. From the beginning, NIEHS required evaluation of all programs, both for the quality of their delivery and the effectiveness and outcomes of that training. (See Chapter 7 for specific examples of training outcomes.) The WETP values the sharing of training experiences -- what works and what does not work. The monthly Newsbrief ran features on the work of individual awardees. Lessons learned are shared at awardee meetings and technical workshops and Trainers Exchanges. Special workshops are sometimes convened. And each year there is compendium of recently written and published articles. Collaborations and consortia also promote a sharing of lessons learned. The program's sharing of experiences are also promoted by partnerships, consortia, and collaborations.

Meetings

Semi-Annual Awardee Meeting. NIEHS gathers its awardees and their affiliates gather for business and program enhancement meetings. Between 50 and 100 representatives of the awardee institutions, NIEHS, the Clearinghouse, and other state and local officials attend these meetings held every spring and fall. Each meeting includes discussion and updates on: administrative and technical issues, grants management issues, issues specific to each grant program (EPA, DOE, MWTP), Clearinghouse issues, and one or two other subjects of particular interest to the program such as the digital divide, status on trainee tracking initiatives, or advanced training technologies.

Semi-Annual Technical Workshops. Twice a year NIEHS holds a technical workshop on an issue of importance to the awardees. Academics, union officials, staff of labor-management organizations, government officials, employers, and other recognized experts attend. These are working meetings that combine plenaries with break-out groups that have specific assignments.

NIEHS has a cutting edge and excellent format for organizing technical workshops. Each year the awardees gather twice to participate in a technical workshop of timely interest. They share in determining the topics of these workshops. In addition to awardees and NIEHS staff, selected experts also participate. There is significant preparation for the workshop beyond logistics and general planning. A "Strawman Document" is usually drafted that provides background and possible actions related to the topic. It circulates before the workshop to all attending, and every participant is expected to read and study the document before arriving at the workshop. After a general plenary, the group divides into pre-determined break-out sessions, each with a specific

mission. Each group has two facilitators and the entire group of facilitators meet together before the workshop, with the workshop organizers distributing “thought stimulators” to guide each break-out group. After several hours, often a full day, the participants reassemble to report back to the group as a whole and discuss ideas from the smaller groups. The workshop organizers then take all the information generated at the meeting and redraft the Strawman Document to reflect the activities of the workshop. This draft is recirculated to each participant, who is asked to read and comment on the revised document. These comments are then gathered, and a final workshop document is generated. Because participants are broadly representative of labor, management, academia, and government, and because everyone’s comments are reviewed, the final product is a Consensus Document on the subject of the workshop.

Past technical workshops include:

- Minimum Criteria Document 1.
- Environmental Job Training for Inner City Youth, April 17, 1995.
- Innovative Technologies II: “Design and Implementation to Protect the Worker,” Technical Workshop, November 1995, which resulted in the paper, Occupational Hazards of Cleanup Technologies: Remembering the Worker.
- Measuring and Evaluating the Outcomes of Training, Technical Workshop, March 1996, which resulted in the Evaluation Resource Guide.
- Successful Training Partnerships: Lessons Learned, Technical Workshop, January 1997, which resulted in the report Successful Training Partnerships: Lessons Learned.
- NIEHS National Trainers Exchange, April 1997, with a report of the workshop, training activities, handouts, and exercises available.
- “Minimum Criteria for Hazardous Materials Train-the-Trainer Programs,” Technical Workshop. December 1997, resulted in a Minimum Criteria Document.
- Environmental Job Training Summit, Technical Workshop, March 1998.
- “Guidelines for Training in Support of Workplace Safety & Health Programs,” Technical Workshop. November 1998, which resulted in the report Guidelines for Training in Support of Workplace Safety & Health Programs.
- “Computer-and Internet-Based Learning Methods in Safety and Health Training,” Technical Workshop, April 1999, which resulted in funded pilot programs.

Special Workshops. From time to time, NIEHS organizes workshops of special interest to all or a subgroup of awardees. For example:

- Y2K Meeting. In mid-1999, officials from NIEHS, the U.S. Chemical Safety and Hazard Investigation Board, and 12 WETP awardee groups, met in Washington, DC to discuss training activities that could better prepare workers for possible Y2K-related emergencies. The focus was on controls related to hazardous materials that could fail; e.g., alarms, computer motherboards, lighting, and pumps. The focus was hazards associated with embedded systems and on inventory, assessment, and remediation technologies was stressed.
- ATT Lessons Learned. Between the two technical workshops on advanced training technology,

NIEHS sponsored a meeting of the awardees who had received awards for pilot projects. These awardees, and a few others that had been involved in ATT efforts, met to discuss the lessons learned from their work and to prepare to share their findings with the entire WETP group at a future technical workshop.

- Trainee Tracking. A trainee tracking initiatives meeting was held in Washington, DC, attended by about 40 representatives of awardee organizations, NIEHS, DOE, and EPA. As a basis for discussion, before and after the meeting, the data collection instruments used by various awardee organizations were collected and analyzed.
- Superfund Job Training Initiative (SuperJTI). During the spring 1999 awardees' meeting, there was a special meeting of the SuperJTI program participants. A notebook was compiled for participants that included information on federal job training programs, and a paper was prepared on job programs, entitled "Federal Job Training Programs: A Summary of Major Activities." In addition, to the awardee meeting and program administration participants, 12 scholarship recipients from cities including Washington, DC, San Juan, Puerto Rico, and Camden, New Jersey took part in the meeting.

National Trainers' Exchanges. The Trainers Exchange brings together best practices trainers from across the nation and from many different backgrounds to exchange information on training techniques, new topics in hazardous waste training, and the challenges faced by trainers. At the first National Trainers Exchange, held in 1994, trainers from all the NIEHS hazardous waste training programs gathered in Baltimore, Maryland to meet one another and to exchange ideas about how to make our training more effective, and empowering. As a result of the success of the first National Trainers Exchange, and the enthusiasm it generated, it was decided to hold one every three years, and a second two-day program was held in 1997 in Manhattan Beach, California.

One hundred and thirty participants, representing all of the NIEHS awardees, gathered in California in April 1997 to exchange information on training practices and techniques. The workshop had panel discussions on the impact of recruiting and involving worker-trainers in delivering health and safety training; reaching new and different audiences through Minority Worker Training Programs and other new training partnerships; and on transition from reliance on government compliance to strengthened collective bargaining, worker training and activism as prevention strategies. The workshop also included interactive workshop demonstrations, including Icebreakers and Games, Participatory Activities, Problem Solving and Action Planning, Training on Technical Information in a Participatory Way, Training on Regulatory Information in a Participatory Way, Technology in Hazardous Waste Training, Addressing Literacy in Hazardous Waste Training Programs, Evaluating the Impact of a Program, The Trainer's Point of View, Worker Trainers' Role in Hazardous Waste Training Programs, Linking Environmental Justice to Hazardous Waste Training, Marketing and Outreach for Training Program, and New Ideas for Train-the-Trainer Programs.

The third National Trainers Exchange was held at the Maritime Institute in Baltimore in April 2000. Nearly 200 trainers from across the country representing dozens of organizations participated. Response to this Trainers Exchange was so overwhelming that registration had to be closed weeks before the event. Participants attended numerous presentations and workshops, displaying the latest developments in the delivery of training to select worker audiences.

Information Dissemination

The main objective of the NIEHS Worker Education and Training Program is to train workers in how best to protect themselves and their communities from exposure to Hazmats. Exposure may be during hazardous waste operations, Hazmat transportation, environmental restoration of nuclear weapons facilities or chemical emergency response. WETP helps organizations build institutional competency to provide model training and education programs. A large part of this involves the dissemination of information, including model curricula, electronic resources, links to online safety and health resources, programmatic and administrative and updates, contracts management, and other program information.

National Clearinghouse for Worker Education and Training

A key to information dissemination is the National Clearinghouse, funded through WETP. The National Clearinghouse for Worker Safety and Health Training for Hazardous Materials, Waste Operations, and Emergency Response, which was created in 1988, provides information and communication services for WETP and its awardees. The Clearinghouse disseminates training materials and information on hazardous waste worker training. It provides technical assistance for a wide and diverse audience that includes many local governments and private-sector employers.

Among its chief activities, the National Clearinghouse for Worker Safety and Health Training:

- Stores copies of curricula developed by the awardees under WETP. Copies of the curricula are distributed at cost to universities, private training groups, foundations, government agencies, and the general public. A curricula reading room, open to the public, is maintained by the Clearinghouse at the George Meany Center for Labor Studies in Silver Spring, Maryland. A curricula catalog is also available on the Clearinghouse web page.
- Facilitates two technical workshops per year, on topics relevant to the NIEHS Worker Education and Training Program and its awardees. Participants include awardees, technical experts, academics, government representatives, and industry.
- Exhibits at trade shows and conferences across the nation, and provides exhibits to awardees when they wish to have a display at local or national conferences.
- Conducts research in areas relevant to the NIEHS Worker Education and Training Program, including regional and local labor markets for hazardous waste workers, and outcomes of safety and health training.
- Provides a web page for awardee interaction and important resources and links.
- Provides Hazmat news to its awardees on a regular basis.
- Provides access to documents produced as a result of technical workshops and Clearinghouse research.
- Maintains a virtual help desk to assist awardees with technical support and advanced training technology initiatives.

Web Site. Early in the 1996-97 contract year the Clearinghouse developed a Web Page. Included on the page were links to the NIEHS Web Page and several other organizations and relevant pages.

Also provided was access to several Clearinghouse documents, to links to health and safety sites across the world-wide-web and a calendar of events. Three years later, the site was getting nearly half a million hits annually.

Newsletter. Since its creation, a newsletter has been regularly produced and disseminated by the Clearinghouse. A monthly Newsbrief served the WETP community for many years, providing up-to-date information on hazardous materials, hazardous waste, emergency response, regulatory process, legislative initiatives, criminal violations, environmental justice issues, available resources including relevant web sites, a section on awardee news, and a calendar of upcoming events. The Newsbrief has evolved into an abbreviated electronic weekly news alert. It is now being published electronically every Thursday, and is available on the new Clearinghouse web page at: www.wetp.org/ under 'Newsbriefs,' or via e-mail subscription. The Weekly Alert contains top news stories, agency updates, a calendar, job announcements, and a weekly feature entitled "On the Web this Week."

Compendium. Each year, the Clearinghouse publishes a compendium of publications, by individuals associated with the WETP program or of special significance to the program. In recent years, contributions have come from: California-Arizona Consortium, Community College Consortium, International Environmental Technical and Training Center, International Union of Operating Engineers, United Auto Workers, Labor Education and Research Center at the University of Oregon, Midwest Consortium for Hazardous Waste Worker Training, National Labor College George Meany Center, New England Consortium, New Jersey/New York Consortium, New Perspectives Consulting Group, Ruth Ruttenberg and Associates, Inc., and University of Alabama at Birmingham. Transcripts from two panels that took place during the NIEHS 10-Year Anniversary Meeting in October 1997 were also made available in the Compendium.

Brochures and Posters. There are many ways in which the program presents itself to the public. In November 1995, the Clearinghouse updated and reprinted its basic program brochure. Thousands were printed and distributed at trade shows, conferences, and meetings around the country. A Ten-Year Accomplishments brochure was produced in 1999 with input from several awardee groups. A 12" x 17" poster about the program, which depicts key training scenes from around the country is also available.

Exhibits. With exhibits, staff represented the NIEHS Worker Training Program at more than 50 meetings and trade shows over the past five years. The program has two exhibits -- a table-top and a full-standing model. They are available for use by awardees, often for regional or local events. Over the past several years the exhibits have been used at meetings of:

- 10th Annual Health, Safety and Environmental Conference
- 1996 Internet HAZMAT Spills Conference
- 6th Annual Atlanta Construction Safety Conference
- American Public Health Association
- Annual Alabama Governor's Safety and Health Conference
- Chemical Emergency Preparedness and Prevention Conference
- Clark-Atlanta University Orientation Meeting

- EPA - NEJAC Advisory Council/Public Dialogue
- HAMMER Dedication
- HAMMER Ground Breaking
- IMIS Conference
- International Apprenticeship Contest and Exposition
- IUOE Hazmat Technical Conference
- Mid-Atlantic Industrial and Hazardous Waste Conference
- Minority Worker Training Introductory Meeting
- Minority Worker Training Orientation
- Mixed Waste Symposium
- National Association of Environmental Professionals Annual Conference
- National Lead-Safe Housing Conference and Exposition
- National Safety Council
- Native American Fish and Wildlife Society Conference
- NIEHS Awardee Meeting
- NIOSH/NIEHS/OSHA Conference
- Society for Occupational and Environmental Health Conference
- SPPILMC Conference on Industry Best Practices
- TRADE Conference
- Trainers Exchange
- United Paperworkers International Union Conference

Presentation of Papers by the Clearinghouse and its Staff at Professional Meetings. WETP staff members frequently attend and present at professional meetings. In FY99 alone, participation included meetings of the American Public Health Association, the Institute of Medicine National Academy of Sciences (NAS) Panel to discuss training needs of occupational safety and health professionals, NIOSH Hazardous Substance Training and Hazardous Substance Academic Training Program Joint Annual Meeting, Brownfields National Partnership Agenda, the American Conference of Governmental Industrial Hygienists, International Symposium on Occupational Exposure Databases and Their Application for the Next Millennium, American Industrial Hygiene Conference, and Annual Brownfields Conferences. Clearinghouse staff has frequently presented papers at professional meetings, in lieu of, or in addition to exhibits. Examples include: *Design And Implementation Of Cleanup Technologies To Protect Workers* at the National Association of Environmental Professionals conference, the Superfund XVII conference, the International Congress on Occupational Health, and the American Public Health Association's annual conference.

Making Resources Available. The Clearinghouse provides technical support services for NIEHS and for its awardees. Technical information specialists over the years have responded to a wide range of inquiries from glove selection to software recommendations.

Reference Room/Library

The Clearinghouse, through its contract with WETP, maintains a resource library at the George Meany Center for Labor Studies. This resource library consists primarily of books, reports, and journals whose central focus is hazardous materials, waste operations, and emergency response,

“Training Makes a Difference” Anecdotal Database

In the 1999-2000 contract year, as part of the NIEHS WETP tracking initiative, a database was developed to present anecdotal evidence with specific examples of how training makes a difference in the environmental safety and health of workers involved in the program. The “Training Makes a Difference,” database contains over 100 records from 18 awardees in over 14 states, and continues to grow.

Bulk Order Materials

The Clearinghouse has over the years supplied, at a 20 percent discount or more, copies of the NIOSH Pocket Guides and North American Emergency Response Guidebooks (NAERG). Tens of thousands of Guides were distributed with thousands of dollars in savings to awardees.

Listserve

The Worker Education and Training Program at NIEHS maintains four listserves to promote communication among participants. There is one for each of the three major program groupings: EPA <<http://list.niehs.nih.gov/mailman/listinfo/supfundwt>>, Department of Energy <<http://list.niehs.nih.gov/mailman/listinfo/doe-wt>> and Minority Worker Training <<http://list.niehs.nih.gov/mailman/listinfo/min-wt>> as well as a listserv for administration and awardee business officials <<http://list.niehs.nih.gov/mailman/listinfo/wtg-admin>>. NIEHS staff regularly post to these listserves. All the listserves now include a collection of prior listings in a monthly archive dating from May 2000.

RFA Virtual Briefing

The Request for Applications Briefing Meeting for the Worker Education and Training Program was made available via the Internet for the first time in 1999. This meeting explored new technologies attempting to provide applicants who are not able to travel to NIEHS a more robust communication conduit. Near-real-time questions were answered from the field as well as near-real-time sound from the meeting were provided to the potential applicants that could not attend. Email was used to address technical questions/problems and answer live questions regarding the 1999 WETP RFA. This was the first time NIEHS had conducted an internet video streaming project of this type and magnitude.

Electronic Communication of Information

WETP makes every effort to remain on the cutting edge of information dissemination practices. They maintain and moderate a number of listserves that keep the program participants updated on

grants administration, training activities, upcoming events, etc. They have also begun to coordinate online, interactive meetings such as the September 1999 RFA Briefing.

The WETP Information Management System is a web-based database application that contains training data and program data in the form of progress reports, courses conducted by awardee, and tracking information. WETP awardees enter data and progress report information via Cold Fusion interface into an Oracle database. This information is then made available to WETP staff by a web-based internal information management system to analyze and run queries of the information. This system has been invaluable in assisting NIEHS staff in analyzing training data and developing annual reports reflecting accomplishments and highlights. This system also helped to alleviate quality control issues regarding submission of data.

Electronic Submission of Data

The NIEHS Worker Education and Training Program designed an online Awardee Data Management System. This system allows awardees to submit, through a web interface, all requisite program training data electronically. As a result the information received by WETP is comprehensive and consistent across awards.

Evaluation

Each awardee is responsible for evaluation of the training sponsored by its consortium members. Each awardee provides training statistics, by course, on the number of individuals and the number of contact hours of training provided. In addition, each awardee evaluates the quality of training, the acquired knowledge of attendees, and the outcomes of the training, once individuals return to work. Evaluation also helps improve future training. There is also a mandated requirement for an outside advisory board to evaluate each program and report directly to the WETP director.

Examples of some of the evaluation techniques and methods employed by the NIEHS awardees include:

- The International Union of Operating Engineers compares scores on questionnaires given to students just before an initial 40hour course with scores on the same questionnaires given to students just before an 8hour refresher course approximately one year later.
- A follow-up study of sites where workers had attended a hazardous waste education program is part of an evaluation of The International Chemical Workers Union (ICWU). Workers are asked what had changed at their work sites in the twelve-month period after their training. To help reduce doubts that some people might have about information gathered exclusively from union members about a union program, a second point of view was obtained by asking the same question to a group of managers who had also attended ICWU education programs. Information from the managers provided an additional data source that could be used to draw conclusions in the evaluation of the training program.
- At a large facility where the United Auto Workers trained only a portion of the workforce, comparisons were made between the workers trained and those not trained. Information was collected both before and after the training program. Before the program, no differences were measured between those who received the training and those who had not. At the time

of the follow-up evaluation, however, 47 percent of the trainees reported changing work practices, but only 18 percent of the non-trainees reported similar changes.

Other NIEHS activities also support evaluation.

Evaluation Handbook. In order to share and analyze best practices in evaluation, WETP awardees held a technical workshop in March 1996. Before and after the workshop materials were collected and papers written about evaluation activities among the awardees. The result was a handbook, published at the George Meany Center for Labor Studies. The Handbook is a guide and documentary of best practices which serves both as an evaluation tool to health and safety experts and a safety and health manual for evaluation experts. Besides basic information in a readily accessible format, the guide provides dozens of appendices with instruments used by the NIEHS awardees in their own evaluations. The Resource Guide for Evaluating Worker Training is available electronically, making the appendices particularly easy to use for those designing evaluation instruments. Many evaluation protocols of NIEHS awardees use innovative techniques to measure both implementation and outcomes. Sharing the innovative techniques developed by NIEHS awardees, as well as reviewing several time-tested techniques, is a mission of the Handbook. This Resource Guide for Evaluating Worker Training presents and explores a range of successful evaluation ideas, techniques, and tools for identifying areas for program improvement; measuring the short- and longer-term accomplishments of a worker training program; and assessing whether, and to what extent, training brings positive change to the work place.

The Resource Guide for Evaluating Worker Training provides:

- Evaluation instruments, either off-the-shelf or to adapt. The Appendix to the Guide has dozens to offer.
- Specific ideas for how to evaluate a worker training program, or specific parts of it.
- General guidance on how to design evaluation, what to measure, how to measure, who to involve, and how to analyze and present findings. The Guide summarizes all the design issues in a Worker Training Program Evaluation Action Plan.
- An overview for those that are new to evaluation to best describe an evaluation.
- An overview for those new to evaluating worker-training programs especially worker-training, which requires emphasis on outcomes as well as implementation and process. The ability of workers to bring their workplace to their classroom, and perhaps even their classroom to their workplace, makes training relevant and transferable. Sensitivity to literacy levels and written test-taking ability allows workers to better understand materials and convey what they have learned. Assessing how workers learn in environments of hands-on, site-specific training is especially important.
- An effective argument on the value of evaluation.

NIEHS Site Visits. WETP staff use site visits as a way to monitor an awardees' compliance and progress toward meeting the goals and objectives of their award. Specifically, monitoring is a review and assessment of programmatic and business management performance based on required reports

and audits, as well as the visit. For the WETP program, site visits are generally conducted with new awardees. There are also proactive compliance site visits to assess the level of understanding of National Institutes of Health (NIH) rules by discussing policies, procedures, and practices at recipient institutions. The ultimate goal is to increase WETP's level of confidence in an awardee institutions' ability to effectively manage NIEHS grant funds. Key subjects at site visits include general accounting, personnel/time and effort, purchasing, contractual and consultant relationships, property management, travel, program income, indirect cost, and close out.

Dement Commission Evaluation Review of WETP Program. In 1995, NIEHS appointed a commission of eight well-recognized national experts to review and evaluate the overall NIEHS Superfund Worker Training Program. The panel, chaired by Duke University Professor Dr. John Dement, considered program, output, productivity, and impact, examining both strengths and weaknesses. The Commission Report had six major findings:

- The NIEHS program fulfills its legislative mandate to provide leadership for more appropriate training of hazardous waste workers.
- NIEHS supported worker training programs are producing high quality training.
- By developing and providing innovative training approaches, methods, materials and evaluation techniques, the NIEHS program is making a significant contribution to hazardous waste worker training nationally.
- The NIEHS program was instrumental in developing the comprehensive benchmark criteria for hazardous waste worker training.
- The NIEHS program is reaching and training segments of hazardous waste worker populations that have been difficult to teach effectively
- The NIEHS program is successfully transmitting health and safety knowledge back into the work place.

Systematic surveillance data that could document NIEHS program success in preventing injuries and illness were not available at the time of the External Panel report. However, the Panel found a wealth of descriptive information from workers, employers, and clients that indicate substantial reductions in serious injuries, reduced threats of illness, and marked decreases in safety violations following the NIEHS training. The case evidence available demonstrates that NIEHS supported training enables hazardous waste workers to better protect their personal safety as well as that of other workers and those in the community in which they are working. Moreover, in some cases workers trained through NIEHS programs have been able to help establish a more safety-conscious work climate generally at their work sites, assuring that proper methods and techniques are used during hazardous waste remediation or emergency operations.

In 1995, the Dement Commission concluded that while there were no systematic surveillance data that could document NIEHS program success in preventing injuries, there was a wealth of descriptive information available from workers, employers, and clients to indicate substantial reductions in serious injuries, reduced threats of illness, and marked decreases in safety violations following NIEHS training. The costs of even a small number of work accidents quickly add up to

more than the yearly cost of the entire NIEHS training program. For example, in one case, the costs associated with an incident involving the improper operation of an incinerator reached an estimated \$50 million in medical expenses, lost wages, and environmental damage -- far more than a single year of funding for the NIEHS training program.

This independent review board³ evaluating WETP found it “cost-effective because the costs of even a small number of work accidents quickly add up to more than the yearly cost of the entire program... [in] one case, the costs associated with an incident involving the improper operation of an incinerator reached an estimated \$50 million in medical expenses, lost wages, and environmental damage. By contrast, the NIEHS program costs approximately \$20 million per year.”

Finally, the External Panel recommended that:

- The NIEHS program receive continued support and funding because it appears to be a good investment in terms of preventing costly work-related injuries;
- NIEHS should increase emphasis on the evaluation of training impact;
- NIEHS should continue to place emphasis on methods for identifying and training under-served target populations;
- NIEHS should continue to focus on health and safety training related to hazards associated with new cleanup technologies;
- NIEHS should provide considerably more emphasis on encouraging participation an active involvement by employers.

SREPP (Self-sufficiency Research and Evaluation Pilot Project). In 1997, several union health and safety training programs along with associated universities, entered into a three-year, multi-union learning, action, and research collaborative called the “Self-sufficiency Research and Evaluation Pilot Project (SREPP)”. The program partners are:

- The American Federation of State, County and Municipal Employees in cooperation with the University of Massachusetts at Lowell.
- The Paper, Allied-Industrial, Chemical and Energy Workers International Union in cooperation with the Labor Institute, New Perspectives Consulting Group, and the University of Alabama at Birmingham (During the project, two of the participating unions (OCAW and UPIU) merged to form PACE.)
- The United Auto Workers and Aerospace Workers International Union in cooperation with the University of Michigan at Ann Arbor.

The initiative was to strengthen the research and evaluation capacities of the participating NIEHS-funded programs. SREPP offers a new model of participatory learning and action in the area of worker health and safety. While there are important examples of participatory action research within the field of worker health and safety, these projects focus on single worksites and have

³An Evaluation of the National Institute of Environmental Health Sciences Superfund Worker Training Grant Program, External Panel Report, December 28, 1995.

tended to start with a stakeholder labor-management model. By contrast, as a multi-union collaborative initiative, this project sought to foster participatory learning across programs and workplaces from a union-centered perspective. The project also built upon the recently expanded role of workers in many health and safety training programs. Over the past decade, programs increasingly embraced peer training models in which workers serve as the primary health and safety trainers. By expanding worker-trainers roles to include evaluation, this project sought to institutionalize a new base of worker-produced knowledge for improving health and safety. Findings included:

- Teams of people in different roles should be involved in evaluation. The job of evaluation belongs to staff, worker trainers, and workers. Everyone involved in a program should be involved in its evaluation. And everyone involved in a program should be involved in using information learned from the evaluation. Participants involved in evaluation need to understand the importance of their role. It is important that the people who participate in an evaluation understand the purpose of the evaluation and why their input matters. It is also important that evaluation participants receive feedback about the evaluation findings to which they contributed.
- Evaluations should be useful to and used by all involved in a program, at all stages of a program. Evaluations are not about collecting information to be filed away and gather dust.
- Evaluation should be part of a program's continuous cycle of learning. Evaluation needs to be incorporated throughout all stages of the health and safety program the beginning, middle and end as opposed to occurring only at the end. Findings should be used to continuously improve training programs.

During the 2000-2001 NIEHS program year SREPP moved from the pilot phase to being a fully operational program.

Tracking of Where Trainees Work. NIEHS has an automated data system for the electronic submission of all training data from awardees to its central office in North Carolina. These data include the course, number of trainees, and number of contact hours. In addition, each awardee collects data on the types of work that trainees do and other data relevant to tracking the association of trainees to hazardous materials exposure.

Each awardee has its own tracking system, to identify where those they train have worked and are working. For some awardees, mostly the industrial unions, significant amounts of training occur at the worksite and a class is filled with individuals who work at that site. For construction unions, the task is more difficult, since many workers change employers, jobs, and job sites frequently. For the university awardees, while some training may be customized for a specific employer, most training is open-enrollment, with individuals from a number of trades and with a wide range of experience and job locations. Some awardees have detailed information about the job experience of each trainee. Several collect detailed information from trainees when they return for refresher training. Each awardee faces its own tracking challenges below are some of the initiatives that WETP awardees use to track their trainees:

1. AFSCME Training and Education Institute collects information during refresher courses from students on types of emergencies, chemicals involved, and their role in emergency response. It also conducts post-training focus group interviews on the impact of training and effectiveness of train-the-trainer program.
2. The California/Arizona Consortium - University Extension, University of California at Davis program derives information from trainee registration forms for the refresher and 40-hour training courses about the Superfund sites at which trainees are working.
3. Clark Atlanta University (CAU)/Xavier University collects mandated information through job-fairs, Family Life and Job Retention Workshops, a MWTP reunion, mail-outs and phone calls.
4. Clark Atlanta University (CAU)/Miami-Dade has worked with an outside evaluator to develop a form to keep track of where trainees are working. CAU is responsible for inputting and maintaining information on a database that is currently being used to track participants enrolled in their MWTP.
5. Clark Atlanta University (CAU)/West Dallas program has a job developer who is working toward placing the first group of graduates into jobs that have already been identified. The job developer has begun the process of tracking these students, according to MWTP mandates.
6. The International Association of Fire-Fighters (IAFF) collects evaluation data from participating departments and trainees. The IAFF has recently developed multiple tools under its QAP effort to ensure consistent and effective data collection. As part of training effectiveness evaluation, IAFF contacts a random sample of Confined Space trainees within 12 months of completion of their training to assess knowledge/skill retention and the impact of training on response activities. The IAFF will also conduct a written follow-up (survey) of Instructor Trainees to assess their use of IAFF hazardous materials training programs for training fire fighters and other response personnel in their departments. Because of scheduling dates, no such data are available at this time.
7. International Chemical Workers Union (ICWU)/Center for Worker Health and Safety Education/EPA Program. In December 1996, ICWUC began collecting initial pre-course evaluation data from participating trainees through a self-administered, pre-class questionnaire. These data analyze nearly 100 matched pre-training to 12-month post-training surveys with participants serving as their own control groups. The long-term follow-up evaluation of this program is achieved by interviews conducted 12 months post training by independent professional evaluators.
8. IUOE Hazmat Project maintains a menu driven Access database system with information on the

demographics, union local, test scores, and courses taken (with dates) for each trainee. Work-history questionnaire data are also included. By inserting dates and locations, IUOE is able to generate detailed reports listing individuals trained in various courses and can thus verify the number of skilled and certified men and women qualified for Hazmat jobs in areas needing skilled workers. Their current tracking system updates daily with training data received from the local unions and DOE training facilities.

9. The Jackson State University staff maintains a record of students placed in jobs after completion of training and contacts students at least twice a month. MWTP participants are contacted by phone to document their employment status.

10. Laborers - Associated General Contractors (AGC) Education and Training Fund MWTP trainees generally experience a smooth transition to the workforce through the Laborers' Construction Craft Laborer (CCL) Apprenticeship Program. Due to the Laborers-AGC collaboration with the Construction Craft Laborer Apprenticeship program, the tracking of job placement process is nearly seamless as it is mandatory that apprentices stay in contact with their Apprenticeship Coordinator and/or Union Business of their local union. In addition to the individual case management also provided by community-based organizations, employment is tracked through information gathered from refresher courses.

A system developed by the Laborers-AGC of tracking students in refresher courses for the EPA Hazardous Waste Training Program as well as their DOE Hazardous Waste Training Program asks trainees during refresher to identify their job locations and the type of work they performed. These data are collected on the HW Refresher Application and added to a database. Reports are generated as needed. In addition, Laborers-AGC documents the hazardous waste or environmental remediation sites at which new hazardous waste workers may be expected to seek employment. This information is obtained in several ways. The training funds, with their business agents, know the work needs in the area and try to tailor their course offerings to meet those needs. Training Funds also identify potential work sites for Laborers-AGC so that planning for courses can be done. Laborers-AGC follows all new large environmental jobs which have already been contracted for the past five years and categorizes these job sites as to type of work (hazardous waste, LUST, or other) and/or as to governmental jurisdiction/program (Superfund, RCRA, Department of Defense, other Federal or State government agencies).

1. The New England Consortium (TNEC) charts information from its registration forms and data base programs about the work of trainees at Superfund, RCRA, and other hazardous waste sites. Refresher course instructors ask all students to provide information on the type of work they have done and list their work sites over the past year.

2. NJ/NY Consortium

A. EPA and DOE Programs. Practical and administrative constraints make on-site tracking of employees difficult for the Center, though the Center does employ various survey methods to obtain data from trainees who have completed training. The Center conducted a pilot in three refresher training courses to assess the quantity and quality of tracking data recalled by trainees about the sites where they worked the previous year. Information recorded on the form included the type of site, site name, name of chemicals involved and number of employees at the site.

B. MWTP. The Hunter College Program for Occupational and Environmental Health tracked employment histories of the 1997-1998 graduates of the Pre-Apprentice Environmental Worker Training Program. Employment histories for some of the trainees came from examining union records of benefit payments by employers for graduates who gained employment in construction and/or environmental firms having agreements with the New York District Council of Carpenters. For other graduates, quarterly reviews were conducted over the phone or in person. In both cases, hourly totals for each month for each employer were requested. Students also provided addresses and where possible, wage and earning data, title, and basic job description.

1. PACE collects information on the trainee's name, address, local union, age, sex, educational background, job classification (ten categories), previous safety and health training, and optional

questions about ethnic identity from its trainee registration form.

The Railway Workers' Hazmat Training Program at the George Meany Center for Labor Studies tracks rail worker trainees who are at risk of exposure to hazardous materials being transported from Superfund sites and the kind of chemicals and dangerous substances the trainees are exposed to while working on the railroads. A database contains information gleaned from questionnaires filled out by the trainees. Trainees have identified approximately 400 Superfund sites around the country with which they had been associated -- through track work, car maintenance, or actual transport.

1. University of Alabama at Birmingham receives information about trainee participation in chemical emergency and emergency response operations through general discussions during classes when trainees return for refresher courses. Information also comes through the Local Emergency Planning Committee.

2. The Center to Protect Workers' Rights

A. EPA and DOE Programs. During the year 2000/2001, CPWR is piloting a tracking mechanism to follow trainees. Its objectives are (1) to ensure that trainees are notified of the need to return for refresher training and (2) to obtain feedback on long-term training effectiveness and work experience at EPA Superfund sites. Postcard size follow-up reminders/questionnaires will be mailed to trainees at intervals following their training. Trainees will provide information of their work assignments and on their use of information provided during training.

B. MWT and BMWT Programs. Apart from trying to secure employment for 100 percent of their students, the trainee follow-up program also tries to facilitate a smooth transition into the workforce for all students by assessing student progress, conferring with supervisors, and determining student needs.

CHAPTER 6

BEST PRACTICES: STAYING ON THE CUTTING EDGE

The NIEHS Worker education and Training Program, in keeping with its model program role, regularly explores new and innovative training ideas. These include:

- The Use of Advanced Training Technologies
- Sensitivity to Issues of Language and Literacy
- Training Needs Assessments
- Labor Market Studies
- Influencing the Emphasis on Health and Safety in the R&D Process
- Creation and promotion of Technical Safety data Sheets
- Y2K worker Awareness Handbook
- The Importance of Integrating Training into Workplace Safety and Health Programs
- Development of Outcome Measures for the Minority Worker Training Program
- Developing a Ten-Year Accomplishment Report
- Explanation and Documentation of Best Practices.

Use of Advanced Training Technology

The development and application of Advanced Training Technologies (ATT) are advancing rapidly. Computer-based training (CBT), Internet web-based training (WBT), distance learning, teleconferencing, multimedia, and courseware applications to training are emerging and often well established. Concurrently, programs based upon the Education Act of 1994, such as the Goals 2000 Program, are already developing the job classifications and curriculum for the ATT technicians and professionals of the next century. While some express caution, ATT and related missions have been launched, but with very few, if any, definitive studies examining the costs and benefits of ATTs. In addition, the application of ATT methodologies to safety and health training is only now beginning to emerge. As a consequence, even less is known about the cost-benefits, or even adequacy, of ATT safety and health applications.

Despite the focus of NIEHS awardees on hands-on training, with small group activities and peer trainers, ATT is gaining increasing attention from a number of NIEHS awardees. Many have applied one or more of the ATT methods when they are consistent with core values. At the time of its Spring 1999 technical workshop on ATT, NIEHS did not have a framework for judging which ATT applications have merit for its training programs, and used the workshop to develop such an initial framework for ATT application criteria.

Some awardees began using electronic technology and other ATT early in the WETP program years. In 1999, the awardees gathered at a technical workshop to discuss how ATT might enhance training

programs. There was discussion about using technology to better access resources and site-specific data. There was also discussion about directly using technology to deliver part or all of a training course. While the core values of the NIEHS program focus on small group participatory peer training, awardees considered ways in which these core values could be maintained while also reaching out to online techniques that are becoming a very popular training medium. A second, follow-up, workshop was held in 2000, with several awardees receiving supplemental funds in the interim to launch pilot using ATT.

NIEHS awarded competitive supplements to four awardees to encourage applications that pilot the use of advanced training technologies. These pilots focus on either improvements to the overall training infrastructure or on areas of content that might be delivered using advanced technology. The pilots were to target improvements in the training infrastructure; for example, improving the overall ATT knowledge level of training developers, involving worker trainers or course instructors in the development of technology-based courses, baselining the status of hardware and software across the health and safety training community, researching and implementing a media selection model for use across a training community.

Progress Summaries of the Four NIEHS ATT Supplemental Awardees

1. Hazardous Materials Training and Research Institute (HMTRI). HMTRI put Hazwoper on the Web in a WebCT-based, self-paced, open-entry, open-exit, 40-hour waste site worker course, meeting the requirements of 29 CFR 1910.120. The course is offered through selected member colleges of the Community College Consortium for Health and Safety Training (CCCHST) and is authored and sponsored by the Hazardous Materials Training and Research Institute (HMTRI). The course has web-based instruction with interactive exercises, hands-on training, CD-ROM based learning, text-based activities, self-grading quizzes, and a final exam.

The goal of the course is to provide the necessary environmental health and safety training required for a Certificate of Completion that will permit the student to go to work at any site requiring Hazwoper training. This basic course provides the equivalent of 40 hours of classroom and performance based training. It does not include the 24 hours of on the job training required at initial entry onto a waste site. All students must pass the final examination. Students are required to participate in at least 8 hours of hands-on training. All students are required to participate at some level in the hands-on training and are evaluated by the lead trainer. A student may enroll and begin the program at any time. Though the course is designed to be self-paced, students must complete the program within 16 weeks of their start date as listed on their registration document.

1. International Union of Operating Engineers (IUOE) National HAZMAT Program: International Environmental Technology and Training Center. The IUOE's CBT course consists of four primary sections: A pre-test, an overview of the OSHA 29 CFR 1910.120 Standard consisting

of 18 chapters, a post-test, and an appendix of additional information and links to internet resources related to the 29 CFR 1910.120 standard. After taking this CBT, student should have a firm understanding of the OSHA 29 CFR 1910.120 Standard and the use of federal regulations in general. The average participant needs 3 hours to complete the course.

The key focus of the IUOE pilot is its peer-trainer instructional staff with efforts devoted specifically to web-based programs that address 1910.120, radiation safety, and medical surveillance. IUOE believes that web-based methods provide a valuable aid to instructors in mastering complex subjects (radiation and medical surveillance) with which, as peer-instructors, they have less experience. The 29 CFR 1910.120 CBT course must be completed before taking the Train-the-Trainer course. The 1910.120 course is currently being re-developed using the WebCt platform.) Materials are delivered online through an in-house server but CD-ROM versions are also available.

1. Railway Workers Hazardous Materials Training Program. During the summer of 2000 the Railway Workers Hazardous Materials Training Program offered a pilot Awareness Training Program on-line to 23 rail workers. Program staff at the George Meany Center for Labor Studies worked with its peer trainers to design and test the on-line pilot. By August, the program enrolled trainees, who had 4 weeks to complete the course. While moving directly through course materials took trainees, on average, only five to six hours, most trainees spent 12 to 15 hours, pursuing their interests in on-line links, related on-line research, and reading and postings on the course bulletin board. And, in the three months after the pilot training course, 25 percent of the trainees have been back to the web site to refresh, expand, or share their training experience. Every trainee interviewed (13 of the 16 who completed the course), was enthusiastic about the on-line experience. All felt it provided them with important and new information as well as a solid base for the 32-Hour Training Course which most of them subsequently took. The following are basic findings from the pilot:

- Because the program is self-paced, it works for those that take the course in a day, in 8-hours and also for those that spread it out over weeks. Everyone gets the information they need.
- The course is not just 8-hours and it is done - trainees go to work, come back home, get on-line and have the ability to directly and immediately relate work experiences to the course materials. The trainees seem to get quickly involved in changing work practices. (See the examples in the Trainee Interview Section.) Students appear to actively use course and on-line resources; for example, go on-line and pull relevant MSDS.
- The relative anonymity of participants can encourage participation.
- There seems to be learning beyond the base course. Most of the trainees took longer than 8 hours to complete the course, not necessarily because of inherent difficulties in the materials or because of technical or computer literacy issues, but because they spent additional time researching topics of interest on-line.
- Some trainees, in the future, there may be difficulties in accessing a computer to take the course.
- The course currently requires that trainees have the ability to read and speak English.

Monthly cohorts of rail workers now take the online course and there is an alumni page for

graduates.

1. United Auto Workers Health, Safety, & Environment Advanced Training Project. The centerpiece of the UAW “Health, Safety, and Environment Advanced Training Project” approach is a web site called the “H&S ATP (Health, Safety, Environment: Advanced Training Project). The web site serves as the linkage point for local site workers and managers to obtain information from diverse sources to evaluate the adequacy of their facility emergency response plans, risk management plans, and process safety management plans. The pilot project objective was to develop a program that provides trainees with the knowledge to obtain occupational health hazards through the Internet. Specifically:

- A web page was created;
- A computer-based training curriculum was developed to facilitate use and application of the web site and the information obtained through the site;
- Instructional programs for Local Union Discussion Leaders (LUDLs) were developed to aid in applying the methods at the local facilities; and
- A detailed evaluation of the pilot program was conducted. The evaluation instrument was a two-part survey that 1) focused on trainee background [Internet use and computer experience] and 2) on course materials, goals, and the training experience.

A preliminary training module was developed based upon a specific case study (Textron) and pilot tested on the University of Michigan campus. Revisions to the web site and the training module were subsequently made based upon the results of the pilot tests. One noted result of the evaluation was the importance and value of peer-training. Subsequently, two training classes were held and evaluated in depth. In general, there has been an enthusiastic acceptance of the program among UAW membership. The UAW plans to integrate the ATT module, which is currently a stand-alone module, into existing training programs and to conduct an ATT Train-the-Trainer session in the summer of 2001.

Other ATT Initiatives by Awardees

Though only four awardees received additional NIEHS funding to develop ATT program, virtually all participants in the WETP grant program have incorporated some ATT elements into their current and future training programs. These efforts include:

AFSCME: has developed its web page and associated resources. Information is being added to the web site and its use evaluated. AFSCME has developed a moderated list serve for the membership. It held some satellite conferences on specific health and safety topics, and used CD-ROM/DVD to augment training.

International Association of Fire Fighters (IAFF): Through the supplemental Y2K support grant, IAFF enhanced its ability to distribute materials via web distribution methods with the initial

emphasis on Y2K materials. This resulted in significant reductions in costs associated with product and information dissemination. IAFF website visits are approximately 40,000 a month. IAFF utilizes the Internet and the IAFF Hazardous Materials web site as an instructional and reference center. The web site has been redesigned to address the needs of instructors and students. Enhancements include an instructor support network via online bulletin boards and development of current case studies that can be shared quickly and utilized by instructors as appropriate to their individual training setting.

Additionally, the IAFF Hazardous Materials Training Department created a Distance Learning web site. The primary purpose of this site is to provide a resource for hazardous materials responders to refresh knowledge and skills obtained during IAFF-sponsored training programs. In addition, the site features information on selected topics of interest to the hazardous materials response community.

The site currently includes two interactive case studies intended to allow the user to apply their skills to real-world hazardous materials incidents and test their knowledge with short, interactive quizzes. Each case study contains valuable information on the hazards faced by responders each day.

- **Confined Space Incident:** This case study is based on a comprehensive report by the United States Chemical Safety Hazard Investigation Board. On March 27, 1998, at approximately 12:15 pm, two workers at Union Carbide Corporation's Taft/Star Manufacturing Plant (the plant) in Hahnville, Louisiana, were overcome by nitrogen gas while performing a black light inspection at an open end of a 48-inch-wide horizontal pipe. One worker died from asphyxiation. The other worker survived but was severely injured.
- **Explosives Incident:** This case study is based on a comprehensive report by the United States Chemical Safety Hazard Investigation Board. On January 7, 1998, two explosions in rapid succession destroyed the Sierra Chemical Company (Sierra) Kean Canyon plant near Mustang, Nevada, killing four workers and injuring six others.

The IAFF incorporated a web-based Hazmat First Responder Operations Refresher course into its site, the purpose of which is to refresh knowledge and skills, designed to build on principles and concepts learned during the Hazmat First Responder Operations program. The program allows fire fighters and paramedics to easily review key information related to safe response to hazardous materials emergencies. It assists fire fighters in meeting the annual refresher requirements for first responder hazardous materials training. The program consists of review sheets that discuss specific portions of the First Responder Operations text. The review sheets can be used as the outline for drills since essential information is highlighted in the text.

Laborers-AGC: The Laborers-AGC recently completed a survey of active Laborers International Union of North America (LIUNA) members, addressing computer access at home. Over 54 percent of the members surveyed have access to a computer. In Laborers-AGC terms this suggests that

approximately 400,000 regular LIUNA members and 250,000 Construction Craft Laborers are “computer ready.” Laborers-AGC, as a consequence, hired a consultant to help integrate ATT, framed as “computer aided instruction,” into all dimensions of Laborers-AGC courses including Train-the-Trainer, Instructor Development (IDP), training support, training materials, delivery, and program development. In addition, ATT aspects are included in the new training office/facility. Laborers-AGC has approached ATT through the development of a detailed and comprehensive ATT “Strategic Planning” process. The Plan includes several phases and multiple tasks within each phase. A Project Team has been assigned to advance the Plan. A support contractor, Electronic Data System Corporation (EDS), has been engaged to facilitate this process. Computer aided instruction development efforts and criteria are focused on the following elements:

- Consolidation of all individual course materials on a single DVD
- Courses will remain instructor-led
- Hands-on component will not decrease
- Conversion of all video/Power Point presentations to digital format
- Create a ‘virtual’ hazardous waste site
- Development of a dynamic web portal
- Provide each instructor with full set of ‘tools’ to conduct training that is ATT-keyed (laptop, DVDs, teleconferencing, etc.).
- Use of digital white board.

University of Alabama at Birmingham: UAB purchased game software that includes Jeopardy (for 3-5 teams), Family Feud (2 teams) and TicTacDough (2 teams). They are using Jeopardy in both worker and emergency response updates. Everything about the game can be edited by the user. UAB has made two versions so far. One requires looking up facts on MSDSs, while the other requires recall of chemical hazards, health effects, and labels. It is loaded with visuals and sounds, and is extremely user-friendly.

Sensitivity to Issues of Language and Literacy

Many groups of workers are hard to reach. Members of the California Arizona Consortium, in 1994, published The Right to Understand: Linking Literacy to Health and Safety Training. This guide helps trainers to learn about the nature of literacy problems facing workers and trainees and strategies to make training work for these individuals. Participatory training techniques are outlined in some detail: ice-breakers, risk maps, role playing, games, small group exercises, “trigger” visuals, brainstorming, demonstrations and hands-on activities, and participatory lectures. Some of the courses have translated materials and some courses are presented in languages other than English:

- University of California at Los Angeles-LOSH
 - RCRA TSD Site Worker - A 24-hr. course written and delivered in Spanish.
- University of California at Berkeley-LOHP
 - RCRA TSD Site Worker - A 24-hr. course written and delivered in Spanish.
 - RCRA TSD Site Refresher - An 8-hr. refresher course written and delivered in Spanish.

- University of California at Davis
 - Emergency Responder Basic Operations - A 24-hr. first responder course written and delivered in Spanish.
- International Brotherhood of Teamsters (IBT)
 - Basic Superfund Site Worker - A 48-hr. course written and delivered in Spanish.
 - Basic Superfund Site Worker Refresher - an 8-hr. course written and delivered in Spanish.
- Railway Workers Hazardous Materials Training Program
 - The railway program is currently developing an 8-hour awareness training program targeting specific Native American rail worker populations. Work is underway in adapting the current course materials to Navajo training populations by translating the course into Navajo and recruiting and training Navajo peer-trainers to deliver the training.

Difficulties with language and literacy can be eased by small group activities. Risk mapping is one such activity. It can cross language barriers. One employer assured LOHP that workers in his shop spoke English, and insisted that the training be given in English. When English-speaking trainers arrived, they found that the majority of the workers spoke only Spanish. Yet a very successful risk mapping session was held with this group anyway. The risk maps themselves were an excellent form of communication between the workers and the English-speaking trainers. Drawing on the bilingual skills of a few workers in the group, everyone was able to join in discussing their maps.

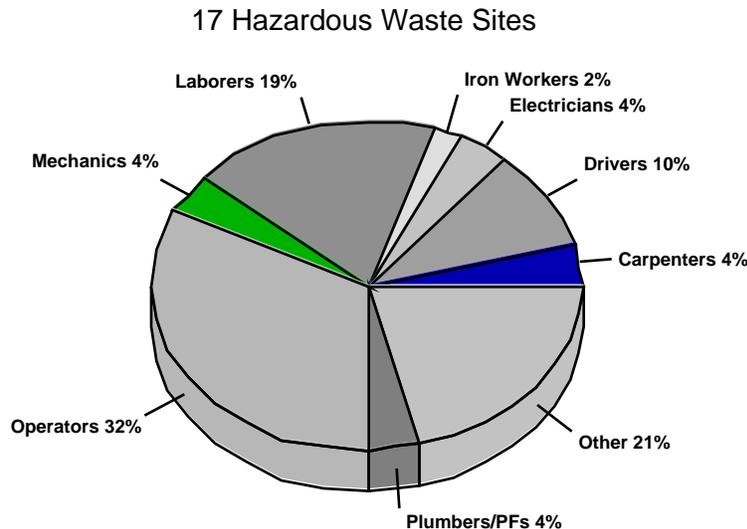
Training Needs Assessments Across the DOE Complex

The on-going and future work of the U.S. Department of Energy (DOE) Nuclear Weapons Complex requires that tens of thousands of employees associated with these sites receive safety and health training. One effort to enhance training capabilities at these sites has been the NIEHS Worker Training Program, created through an interagency agreement with DOE. This program originated in 1993 and an initial needs assessment was conducted to better understand training needs across the Complex. At that time, it was estimated that between 10,000 and 60,000 workers at DOE facilities would require training.

A second needs assessment report was completed in 1997, and a third report was released in May 2000. The report “FY 1999 Accomplishments, Highlights & Future Directions: NIEHS/DOE Hazmat Worker Training Program,” examines the development and progress of the NIEHS WETP DOE-specific training programs.

Labor Market Study of Hazardous Waste Workers and Associated Emergency Responders

Crafts as a Percent of Gross Pay



With tens of thousands of hazardous waste sites to be cleaned up within the next few decades, NIEHS gave careful consideration to the actual scope of work to be done by cleanup workers. The Labor Market Study of Hazardous Waste Workers and Associated Emergency Responders analyzed the amount of work, skills needed, and payroll required to get the job done. It was intended to be a tool for those who train workers in job skills and in safe handling of hazardous materials, as well as those who plan and regulate work site cleanup.

The study found that the nation's commitment to clean up hazardous waste sites will require 5.5 billion hours of work over 25 years, or approximately 3.5 million job years - with the number of actual employment episodes closer to 7 or 8 million, due to the part-time nature of many construction-related jobs. Such a high level of demand and growth requires planning so that a sufficient number of workers are trained not only in specific crafts, but also in hazardous material operations.

Equipment operators, laborers, truck drivers, carpenters, mechanics, electricians, plumbers, iron workers, and others will earn more than \$758 billion dollars and provide a safer environment for the nation. Equipment operators, laborers, and truck drivers make up approximately 60 percent of on-site construction payroll. Carpenters, mechanics, electricians, plumbers/pipe fitters, and iron workers comprise an additional 20 percent of that payroll. Other crafts include asbestos workers, boilermakers, chemical workers, painters, roofers, and sheetmetal workers. Many more individuals perform on-going operations and maintenance activities, sometimes for decades beyond the time of actual remediation, and hundreds of thousands of emergency responders will aid in the process and help save lives and properties when spills, leaks and explosions at hazardous waste sites threaten

the lives of both workers and nearby community residents.

Those who work at the sites must be trained in how to handle hazardous materials safely, protecting both themselves and those living near sites from safety and health risks. Most site workers are also residents of neighboring communities, with 50-80 percent of workers at most sites living within 25 miles of the site at which they worked.

How many people work at what tasks in the future is dependent on the budget allocated to cleanup as well as the intensity of cleanup mandated and new technologies that are introduced. More than 1200 sites are identified on the National Priority List and tens of thousands more will require the attention of hazardous waste workers across the country.

The Labor Market Study was funded through an interagency agreement between EPA and NIEHS, in order to better understand the number of workers and the skills they need to accomplish such an enormous multi-hundred billion-dollar task. The primary data for the study came from certified payrolls of actual cleanup sites. This approach -- of collecting wages earned, hours worked, and residence of worker from over 80,000 records -- was chosen so that projections would be based in actual on-site experience. Additional databases were developed by the research team at Ruth Ruttenberg & Associates, Inc., including one of state emergency response data detailing hazardous materials incidents in Arizona and New Jersey, a large database of state sites as well as data disks on work at EPA removal sites.

Influencing the Emphasis on Health and Safety in the R&D Process: Remembering the Worker

According to a July 1995 Office of Technology Assessment report, "Environmental Technology: Analysis of Selected Federal R&D Programs," \$2.5 to \$3.5 billion were spent in one year alone by Federal Agencies involved in research, development, and demonstration of new environmental remediation technologies. DOE, DOD, and the EPA all have major programs focusing on this area. But, these efforts rarely give focus to the safety and health of the workers who operate the new technologies. Neither do these programs adequately address prevention and emergency response. Instead, such issues are usually addressed after the technology is deployed -- a time consuming and costly approach. There are several recent, notable Federal efforts to develop comprehensive approaches to merging worker safety and health concerns into the development of new and innovative remediation technology. Among them are the following:

- In 1993 the EPA-Labor Superfund Safety and Health Task Force began focusing on new technology issues, resulting in an expanding awareness among the several agencies represented on the Task Force, which included EPA, DOE, NIEHS, the Army Corps of Engineers, NIOSH, and OSHA. OSHA, under a cooperative agreement with EPA, undertook an effort to assess safety and health issues associated with new technologies already deployed and in operation at some EPA Superfund sites. The result was a unique program and product that provided a field-based safety

- and health guideline for hazardous waste site incinerator operations.
- EPA undertook the development of “Best Management Practices” for soils treatment technologies, which did not address safety and health issues.
 - The Presidential Review Findings pursuant to Section 112 (r) (10) of the Clean Air Act prompted a multiple-agency effort to focus on the development of an Integrated Contingency Plan Guidance intended to be used by facilities to prepare emergency response plans.
 - The Department of Energy funded a study to develop guidelines incorporating worker safety and health concerns in to the design and development of new environmental remediation technologies.

In 1995 DOE and NIEHS were joint sponsors of two technical workshops that addressed occupational safety and health and emergency response hazards associated with new and innovative environmental remediation technology.

Both agencies have large stakes in occupational safety and health and emergency response management. NIEHS has been the administrator of the Federal hazardous waste operations and emergency response training grant program and, more recently, has administered the similar DOE training grant program. DOE has a well-funded and very active innovative environmental remediation technology development program, recently expanded to embrace occupational safety and health and emergency response issues through a partnership with the DOE Office of Worker Health and Safety. Concurrently, the DOE Office of Worker Health and Safety’s new personal protective technology development program has begun to emerge.

The first technical workshop, held in the spring of 1995, developed a framework for encompassing the occupational safety and health into the new technology area. The second, at the end of 1995, using the first workshop product as a foundation, focused on the development of guidelines to aid those engaged in all aspects of new environmental technology in addressing and eliminating or mitigating occupational hazards and in providing the information essential to the development of effective emergency response programs at sites where the technology is deployed.

The workshop report includes an overview of the technology life-cycle continuum in light of safety and health considerations, a section on “Applying Process Safety Management Techniques and Technology Safety Data Sheets to the Development of New Cleanup Technologies,” another section on “Emergency Response Considerations for New Technology.”

Creation and Promotion of Technical Safety Data Sheets (TSDSs)

A significant contribution of the “Remembering the Worker” technical workshops was the development and elaboration of Technical Safety Data Sheets (TSDSs), similar in nature to the Material Safety Data Sheets already used throughout industry. Technology Safety Data Sheets are important instruments for communicating safety and health information about a new technology. TSDSs would be used by workers who operate and maintain the technology, safety and health professionals charged with protecting personnel on hazardous waste sites, and regulators who must

write permits for technologies on state Superfund sites.⁴

The International Union of Operating Engineers National Hazmat Program (OENHP) has created TSDSs for over 60 technologies ranging from robotic asbestos strippers to carbon dioxide floor blasting systems. OSHA has created several and safety and health professionals in the Navy have developed data sheets for maintenance equipment and made them available through the Internet for Navy maintenance workers worldwide.⁵

In April 2000 a DOE advisory board presented a resolution to the Assistant Secretary for Environmental Management (EM) for DOE, that TSDSs should be created for all environmental remediation technologies currently being funded by EM. The resolution indicated that the documents should be created for the mid-stage review; i.e., after the technology is approximately halfway to deployment.⁶

The EPA/Labor Superfund Task Force is considering the value of TSDSs and how federal agencies can support their development and use. The first step is to create a generic format that incorporates the best aspects of the existing TSDS templates. A National Technical Workshop sponsored by DOE in October 2000 advanced the generic format of TSDS through consensus on the following points:

1. The TSDS document should be created primarily for workers.
2. TSDSs can assist in hazard assessments but should not take the place of more formal assessments.
3. All hazards should be identified and rated as either low, medium, or high risk.
4. TSDSs should identify hazards in each phase of the technology from construction, through operation and maintenance, to final decontamination and dismantling.
5. TSDSs should be kept in close proximity to the technology for easy access by workers.
6. TSDSs should be used as tools for training workers.
7. Creating a TSDS can help a technology developer comply with the European requirements for a CE Mark as well as the new ANSI recommendations for machine tools found in B11.TR3:2000.

⁴ Matthew Fitzgerald conceived of the idea while working under a contract with the Department of Energy in 1994.

⁵ See <www.navfac-safety.navy.mil/tsds.htm>.

⁶ Environmental Management Advisory Board, Worker Health and Safety Committee, Preliminary report: Consideration of occupational safety and health in the EM-OST technology development program, 7, April 13, 2000.

Y2K Worker Awareness Handbook

WETP staff and awardees worked closely with EPA's Chemical Emergency Preparedness and Prevention Office (CEPPO) staff, EPA regional offices, and the U.S. Chemical Safety and Hazard Investigation Board to address chemical safety concerns as a result of the Century Date Change. NIEHS developed a Y2K Worker Awareness Handbook and associated training resource materials in response to health and safety concerns raised by the President's Council on Year 2000 conversion, the President's Chemical Safety and Hazard Investigation Board, OSHA, and EPA.

Of concern to NIEHS awardees were commercial and industrial activities involving hazardous and toxic materials that might be affected by the Y2K computer technology problem. The NIEHS awardees also addressed with emergency response issues, as well as waste site operations and RCRA/TSD facility concerns.

The IAFF Hazardous Materials Training Department, through a cooperative agreement with NIEHS, took the lead among emergency service organizations in providing Y2K awareness training and tools for first responders. All of the information was made available on the IAFF's Hazmat Training Department's web site at: <<http://www.iaffhazmat.org/>>.

The IAFF developed, with cooperation from several different local fire departments, realistic and interactive case studies to show how Y2K problems might have affected incident responses in various types of occupancies including: high-rise buildings, mass transit facilities, single-family dwellings, public assemblies, and chemical manufacturing enterprises.

The Y2K Worker Awareness Handbook, which was distributed widely in hard copy is also available for download on the Clearinghouse web page. The course targeted specific risks for workers in a variety of sectors including chemical and industrial facilities, the construction trades, the health care industry, transportation, hazardous materials related fields, and emergency response activities. The Handbook included an overview of who and what the Y2K problem could potentially impact, an update of the state of the individual industries' Y2K compliance, an outline of how the problem might affect different work places, as well as measures workers could take to safeguard themselves, their facilities, and their communities.

The Importance of Training in Workplace Safety and Health Programs

During November 1998, a technical workshop was held in Silver Spring, Maryland, at the George Meany Center for Labor Studies, to develop a consensus document, Guidelines for Training in Support of Workplace Safety and Health Programs. NIEHS and its National Clearinghouse sponsored the workshop. Invited participants, who represented a diverse range of constituencies, were primarily individuals with long-term experience in developing and delivering training required

by the OSHA Hazwoper standard. Hazwoper represents the most advanced OSHA standard with regard to safety and health program and training requirements, and so the workshop participants represented individuals who are among the most experienced in the nation with training programs associated with safety and health programs.

The workshop participants developed consensus guidelines, based on the unique experiences of the participants and provided guidance for development of training activities in support of employer safety and health programs. At the time, OSHA had announced, in its annual regulatory agenda for the Agency, its intention to promulgate a Notice of Proposed Rulemaking for a comprehensive Safety and Health Program Rule. Participants hoped the guidelines developed at the workshop would serve as important guidance to OSHA during the rulemaking process and to employers and trainers who seek to develop quality workplace training programs in support of their safety and health programs. A guidance document was adopted by consensus.

Development of Training Outcome Measures for the Minority Worker Training Program

The Clearinghouse prepared background information for NIEHS's MWTP, which included:

- Evaluation criteria used in other federal job training programs
- GAO criticisms of federal job training program evaluations and possible NIEHS improvements
- GAO recommendations for evaluating federal job training and NIEHS "response"
- Background information on nine federal job training programs that target economically disadvantaged populations
- A suggestion of data to be collected in establishing an NIEHS monitoring and evaluation system
- Bibliography.

Also, Clearinghouse staff participated in conversations and conference calls with NIEHS staff and with individual awardees about possible evaluation criteria.

Developing a Ten-Year Accomplishments Report

The accomplishments of the NIEHS awardees are illustrated in a 24-page, full color report, available on-line and through the Clearinghouse. There is also a poster. The report was distributed at many meetings including Brownfields '99 in Dallas, APHA in Chicago, Trade in Amarillo and the NIOSH/NIEHS/OSHA Training Conference in St. Louis.

Explanation and Documentation of Best Practices

This paper reflects the work of the Clearinghouse and its subcontractor Ruth Ruttenberg & Associates, Inc. to describe and analyze the lessons learned and best practices of the WETP program. WETP, as a model program, continually seeks to identify best practices.

CHAPTER 7

BEST PRACTICES: STANDARDS OF EXCELLENCE

Standards of excellence are the hallmark of the WETP program. Shortly after the program began, awardees and staff gathered to establish minimum criteria for training. WETP emphasizes consortia, partnerships, collaboration, and activities that strengthen the environmental justice movement. The program participants continually work to document the outcomes of training -- fewer injuries, fewer illnesses, and fewer premature deaths. Perhaps the best indicator of program excellence is that training makes a difference.

Minimum Criteria for Training

Soon after making initial awards, WETP awardees and staff began working on guidance for the development of model Hazwoper curricula. The effort was so successful, that the ensuing document, Minimum Criteria for Worker Health and Safety Training for Hazardous Waste Operations and Emergency Response, is now a non-mandatory appendix to OSHA's rule for hazardous waste operations and emergency response, 1910.120. The Minimum Criteria document reports the result of a technical workshop on training quality, held in 1990. NIEHS worker training program established criteria for determining the quality of worker health and safety training programs, especially for meeting the training requirements of 29 CFR 1910.120. Awardees identified, evaluated, discussed, and made recommendations on training quality issues. The workshop brought together representatives from each of the NIEHS awardees, as well as other experts from management, labor, academia, and government.

Excellence Promoted Through Consortia, Partnerships, and Collaborations

The entire WETP program is based on interagency agreements. The awardees build consortia. Twice a year awardees share their experiences at awardee meetings and technical workshops. Training programs sometimes involve community groups and often involve employers. Reaching out to work with others is a hallmark of WETP.

Consortia of Awardees: Labor, Labor-Management, and Universities

The entire NIEHS program is based on partnerships. Awardees, in consortia, represent labor organizations, labor-management groups, universities, and community-based organizations (See Appendix). The twenty awardees represent more than ninety organizations. Some groups represent very large consortia, such as the Community College Consortium for Health and Safety Training. Some groups represent large numbers of trade unions, such as the Center to Protect Workers' Rights -- that represents a consortium of several building trade unions, including the

asbestos workers, carpenters, ironworkers, painters, sheet metal workers, boilermakers, plasterers, and the cement masons. The International Chemical Workers Union also represents Aluminum, Brick, Flint, and Glass Workers, Machinists, Steelworkers, the Coalition of Black Trade Unions, the University of Cincinnati, and the Great Cincinnati Occupational Health Clinic. Many of the Minority Worker Training Programs are based in universities, but also have a strong tie to a trade union that help provide entrance opportunities and sometimes pre-apprenticeship certification to MWTP graduates.

Collaboration Among Awardees. On several training projects, groups of awardees engage in joint efforts:

- Evaluation (SREPP)
- Using training facilities owned by others
- Sharing training curricula
- Sharing training equipment
- Sharing trainers
- Bulk ordering of resource materials
- Technical Workshop collaborative efforts: co-chairing panels, creating workshop materials, and planning
- The National Trainers Exchange.

Collaboration Within Communities. Each awardee of the Minority Worker Training Program has a network of community groups and government programs that support its work. Common collaborations are with One-Stop Centers, the Welfare-to-Work programs, School-to-Work programs, Housing and Urban Development programs, and EPA regional programs. Other partnerships are with childcare providers, community youth centers, Opportunities Industrialization Centers (OIC), local Urban League offices, and organizations that assist students in obtaining Graduate Equivalency Diploma (GED) training.

In San Francisco, the Laborers-AGC program partnered with local unions, colleges, community-based organizations, and environmental and construction contractors, resulting in an increased number of trainees entering the union. Seventeen of the 21 trained entered the Construction Craft Laborers Apprenticeship Program.

A pilot collaboration with the San Francisco Minority Worker Training Program and the Northern California Teamsters Apprenticeship Program led to two students certified in hazardous waste work and receiving Class A Commercial Drivers Licenses. Both were employed in teamster apprenticeships.

DePaul University worked in Kansas City with the Center for Workplace Education, two Kansas City partners, ERA Environmental, and the Full Employment Council (FEC). FEC is a business-led, private non-profit corporation whose mission is to obtain employment for the unemployed and

underemployed in Greater Kansas City. FEC accomplishes this goal by working in collaboration with business, local units of government, educational institutions, and community-based organizations. In Chicago, DePaul worked with the Chicago Department of Environment, Bethel New Life, One Stop Employment Center, and the Center for Workforce Education. In Baltimore, DePaul worked with the Alice Hamilton Occupational Health Center and several community-based organizations, including East Baltimore Career Center, Baltimore Works, Jubilee Baltimore, Gateway, and Plowshares.

Partnerships With Employers. Training partnerships between the awardees and employers can be difficult to initiate and develop, but once established are of great benefit to all parties. Trust, honesty, and a commitment to cooperation seem to be the glue that holds partnerships together. Another useful ingredient for a successful, long-term partnership is continuing support from upper management. Enlightened self-interest is a critical feature for all partners; leading to a win-win result for all parties, including the trainees.

Success stories seem to have at their core, embodied in at least one of the partners, an established infrastructure with both facilities and trainers. Success is not usually built on ad-hoc arrangements. For many, this infrastructure was made possible by NIEHS financial support. For others, NIEHS support allowed a pre-existing infrastructure to expand activities and audiences in significant ways. One supervisor looking back on a training program by the Service Employees International Union, comments:

“What I like about it, everybody got on the same wave length, all trying to do the same thing. Now not everybody’s doing their own individual thing, everybody knows what’s supposed to be done, and its (not) just CYA. Where as we’re together on it finally.”

The following examples illustrate some of the successful partnerships established by NIEHS awardees:

Partnership with DOE contractors. A partnership formed among the DOE’s Oak Ridge Reservation, Lockheed Martin, MK Ferguson, and the United Brotherhood of Carpenters. They were successful in finding new ways for contractors to operate. James Meredith, training director for MK Ferguson, felt that a key milestone in the Tennessee program was the “Partnership for Safety Agreement.” The agreement stressed and verified the commitment of MK Ferguson, the subcontractor community, and all site employees to conduct operations in a safe manner. The “Partnership for Safety Agreement” stresses individual initiative, accountability, and ownership in the dedication to safety and health. MK Ferguson’s partnership with the unions allows for the workers to serve on the training subcommittee, to make recommendations for a more cost-effective program, and to help develop safety and health causes. The partnership is proud of its 2.5 million safe man-hours and all partners believe that trust, respect, and honesty are the foundation of a successful partnership.

In early 2000 Secretary of Energy Richardson signed a labor agreement between DOE and the International Union of Operating Engineers (IUOE) that created an outreach program to recruit, train, and retain Hispanic workers at DOE sites nationwide. As part of the agreement, hundreds of prospective Latino workers were trained in a number of high-skill areas including national security, energy resources, environmental management, and science and technology. All of the appropriate information, publication, documents, and manuals necessary to carry-out the work at construction and cleanup sites were translated into Spanish.

Partnerships between industrial trades and employers. The International Chemical Workers Union Council Training Center (ICWUC-TC) and Libbey, Inc. (Toledo, Ohio plant) formed a training partnership with equal involvement of the two. The four local unions representing the workers at Libbey Inc.'s Toledo plant are the American Flint Glass Workers Union (AFGWU) Locals 700 and 65, the International Association of Machinists and Aerospace Workers (IAM&AW) Lodge 105, and the Glass Molders & Potters (GMP) Local 59. The plant produces glassware, such as vases and glasses and employs approximately 1,000 workers. Together, union representatives and company representatives agreed to train union members from the shop floor to conduct health and safety training for all workers at the plant, both hourly and salary. Sixteen workers became trainers. The unions and the company agreed upon the criteria for selection of the peer trainers. One very important consideration was insuring that all departments had peer trainers so that workers would be training co-workers. This added credibility to the training. According to one local union president, "The uniqueness of the program is of great benefit to Libbey Glass. The extent to which the training is a joint program with union and management each having input on all aspects helps to break down previous barriers between the parties. What made the program so unique is how it was tailored to the plant's needs on the topics that were chosen. I am very impressed with how union and management worked together to make the plant safer," said a former President AFGWU Local 700 and Center Instructor.

GATX Logistics is one of the largest providers of contract services in the world. GATX helps businesses to manage their supply chains through a variety of integrated services and technology, 3,200 employees and a comprehensive distribution network throughout North, Central and South America. While GATX has the experience in shipping and warehousing of some hazardous chemicals, it plans to increase the number of chemicals handled in the near future. GATX entered into a partnership with DePaul University to assure that all employees are properly trained, even those who might have accidental exposure to these chemicals.

Partnerships with municipalities. The city of Duluth, Minnesota and the American Federation of State, County, and Municipal Employees (AFSCME) forged an effective emergency response partnership -- based on training, coordination, and trust. Over several years, municipal employees of the departments responsible for water, sewers, roads, and public works have

become recognized as an important part of emergency response planning and implementation. They are, in fact, collateral duty emergency responders and need to be trained as such. When there is a spill of a Hazmat that goes into the sewers, it is AFSCME members that face exposures to Hazmats as they put in a sewer plug. When there is a hazardous material spill on a highway, it is AFSCME members that hose the highways and bring in sand and spreaders.

Duluth's Loss Control Manager provided an example, which helped forge the partnership involving a benzene spill. Members of the Duluth Fire Department were one-third through a hazardous materials training course when a major benzene spill occurred. The city was sealed off and evacuated. One of the trainers, from the Midwest Center for Occupational Health and Safety, took charge as the on-site supervisor, while the Duluth Fire Department, with air monitoring equipment from the training program, became the emergency response team. The training equipment was used to monitor the spill, and the partially-trained Duluth Fire Department was the emergency response team. As a result of this incident, officials in Duluth decided to provide Hazmat training to the city's Department of Water and Gas employees.

According to an AFSCME representative, municipal officials, like those in Duluth, appreciate the NIEHS-supported Hazmat program, and that training might be impossible without financial support from the government. The introduction of these Hazmat programs provides public and private sector officials with an introduction to the need for such other training programs as hazard communications.

Partnerships with States. According to an employee of New Jersey Department of Health and Senior Services (NJDHHS), Right-to-Know Program, responsible for developing the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheets (NJHSFS):

“Due to information learned in the 8-hour hazardous waste training course with New Jersey/New York Consortium under the direction of the University of Medicine & Dentistry of New Jersey (UMDNJ), the New Jersey Department of Health and Senior Services, Right-to-Know program has started to include new information on the NJHSFS. The NJHSFS have always included the DOT/UN number, however, they did not include the designation of Poison Inhalation Hazard (PIH). The information presented in the 8-hour refresher included a discussion of substances designated as PIH. After the training, the NJDHHS revised the NJHSFS to include this important piece of information. Adding this new information may prevent a serious injury from occurring. The NJHSFS describes individual hazardous chemicals; contains acute and chronic health hazards, identification, workplace exposure limits, medical tests, workplace controls and practices, personal protective equipment, handling and storage, questions and answers, definitions, and emergency response information for fires, spills and first aid. These fact sheets are widely used in industry. “

Partnerships with small business. Webb Tools, Inc., a company that builds computer cases, had just been inspected by OSHA and cited for 35 violations totaling \$41,400. The company had no human resources (HR) department, let alone an HR manager. No safety programs or training

programs had ever been provided to its 200 employees, 70 percent of whom spoke only Polish or Spanish.

OSHA directed the company to train all employees in Hazcom in eight weeks. Webb Tools quickly hired an HR Manager, a manager who had previous experience working with DePaul University as a training provider. DePaul was able to work with Webb Tools to get the Hazard Communication training done, and more. The OSHA inspection, and subsequent training jump-started systemic cultural changes. A safety committee was established; there was increased awareness of safety; other training programs were instituted; workers took ownership of the PPE program and Webb Tools' in-house training capacity was improved through a train-the-trainer program offered by DePaul.

The partnership was not just between Webb Tools and DePaul, but also with OSHA. When OSHA saw the quality of the training program, the tone of its relationship with Webb Tools changed. After seeing everything that Webb Tools had done to remedy its violations, OSHA reduced the penalties from \$41,400 to \$19,500.

Webb Tools felt that the training partnership with DePaul worked because DePaul was able to customize curricula in English as a Second Language and basic math, along with teaching team skills and cognitive enrichment. The training provided by DePaul is learner and client centered. It fast, focused, friendly, and flexible.

Partnership in the rail industry. A safety initiative conceived and implemented early in 1998 by the Brotherhood of Locomotive Engineers (BLE) enhanced the ability of employees to address safety issues and recommend improvements on the CSX rail system. Called Structured Employee Network for Safety Empowerment (SENSE), the initiative revised CSXT's safety program and further extended the process into the ranks of BLE-represented engineers through ownership, credibility and accountability. SENSE uses employee mentoring and empowerment to create the environment for an accident-free workplace, replacing confrontation with communication and trust. Safety issues and concerns are channeled through union representatives to front-line field supervisors. Issue resolutions are reported back through the SENSE channels to employees.

Partnerships Between NIEHS Awardees and Other Groups. Some of the NIEHS awardees have formed partnerships with other groups representing workers in need of the quality training provided by WETP. One such partnership was formed between The University of Alabama at Birmingham (UAB) Center for Labor Education and Research (CLEAR) Training Program, the American Forest and Paper Association, and the United Paperworkers International Union (UPIU). The program goal is to train all the participant union employees to respond to emergencies and chemical spills, and to put into place a network of trainers that can do training in the local unions and workplaces.

From 1993-2000, 12,000 members of the UPIU were trained. Approximately two-thirds of them were trained in union/company partnership training by union member trainers at pulp, paper, and other industrial work places. The companies involved in the partnership had a positive reaction to the partnerships. One of the reasons attributed to the program's success is a strong union-management relationship. Management is often invited to participate in the training by union members. Their experiences improved labor relations and resulted in improved worker morale. Additional results of the training partnerships include: companies saving money by utilizing peer training; more workers receiving more extensive training of better quality; emergency incidents being resolved quickly and safely following UPIU member training; and emergency plans being written and upgraded by union members following training.

Historically, UPIU has been UAB's key training partner. However, the program has expanded into a coalition involving the International Union of Electronic, Electrical, Technical, Salaried and Machine Workers (IUE); the Glass, Molders, Pottery, Plastics and Allied Workers International Union (GMP); and Johnson C. Smith University, a historic black university, in Charlotte, North Carolina. Other organizations that participate in the partnerships include the UAB School of Public Health and the International Occupational Health Foundation.

As of January 1997, fifty-three managers, invited by UPIU members in their plants, attended classes taught by UAB instructors. One hundred thirty companies were represented by members and managers, and nine OSHA compliance officers attended training classes. The peer training aspect of the partnership training program has saved companies approximately \$1,000 per participant or \$6,600,000 for the 6,600 employees trained by UPIU members.

In some facilities, the safety record improvement can be credited, at least in part, to the joint training effort. Trained workers are writing emergency plans. Joint safety committees are tackling complex problems with clear goals and structured steps to achieve them. Labor and management are working together better than ever before in the paper industry, an improvement that by joint training programs enhance.

Interagency Agreements (IAG) With Other Federal Agencies. Interagency agreements are the foundation of the NIEHS program. IAGs exist with EPA, DOE, and DOT, with the EPA and DOE agreements currently funded.

Collaborations With Federal Agencies. A National Conference on Workplace Safety & Health Training held in 1999 in St. Louis and sponsored by NIEHS, OSHA, and NIOSH, brought together cross-sector representatives to look at the workplace of the future, and plan new approaches to occupational safety and health training, evaluation strategies, and enabling policies to meet the challenges ahead. Participants discussed how changes in the nature of work and the makeup of the work force require changes in training and education programs. Participants explored how training and education relate to other components of effective health and safety systems, identified new

approaches and technologies to enhance traditional teaching methods, and considered how to evaluate the impact of training and education programs. The conference stimulated collaborations among business, labor, academia, professional associations, government agencies, and others.

NIEHS cooperates with the Idaho National Environmental and Engineering Laboratory (INEEL) of DOE on issues of advanced training technology.

By working in tandem with EPA regional offices and other Federal, State and local environmental agencies, the DePaul University broadens professional licensing opportunities for students. Working with EPA Superfund Community Involvement Coordinators and other EPA offices built increasing opportunities for their students.

The Laborers-AGC Minority Worker Training Program in New Haven, Connecticut, working with the Greater Dwight Community Development Corporation, secured Department of Labor approval for the New Haven MWTP as a Department of Labor approved program. This entitled qualifying participants to state reimbursement for childcare while they were in the program.

In April 2001, NIEHS is sponsoring a technical workshop with the OSHA Training Institute (OTI) in Chicago, to highlight Best Practices (which this report details) and new methods of hazardous materials training.

EPA/Labor Task Force. In late 1992 OSHA joined EPA in an interagency agreement, and participated with EPA in forming the EPA/Labor Superfund Health and Safety Task Force. Other organizations participating in the task force include NIOSH, the Laborer's Safety and Health Fund of North America, IAFF, the U.S. Army Corps of Engineers, the International Brotherhood of Teamsters, NIEHS, DOE, and the International Union of Operating Engineers.

The task force mission is to evaluate and improve worker safety and health at hazardous waste facilities and to improve communication among task force members. During a subsequent 34-month period, the task force reviewed the safety and health plans of 18 Superfund remediation contractors and conducted 10 comprehensive site audits. Based on the results of those audits and plan reviews, the task force has prepared training and guidance material for both compliance officials and hazardous waste contractors.

Conducting comprehensive site safety and health audits is one of the major initiatives undertaken by the task force. These audits are performed by teams of OSHA professionals who spend three to four days assessing a site's implementation of OSHA's Hazardous Waste Operations and Emergency Response standard (Hazwoper, 29 CFR 1910.120) and evaluating the overall effectiveness of the site's safety and health program. Audit team members examine each contractor's written site safety and health plan and other program documentation; interview employees, safety and health personnel, site management, and union representatives; conduct walk-

through inspections; collect wipe samples or air samples as necessary; and talk with local emergency response agencies. Information collected during these audits is used both to improve worker safety and health at the audited site and to educate the task force about field conditions and field needs.

Environmental Justice. Many of the NIEHS awardees are active participants in environmental justice programs and activities. Some are a direct outgrowth of NIEHS funding.

In 1996, the Southwest Network for Environmental and Economic Justice (the Network) and the Labor Occupational Health Program (LOHP) at UC Berkeley received a Community-University Partnership (CUP) grant from the EPA. The Network and LOHP partnered in the development of a training program, with the goal of enabling environmental justice activists in the Southwest to train members of their communities on issues of occupational and environmental health and safety. By doing training and outreach on health and safety, they were able to expand their efforts to address local environmental and occupational health concerns. LOHP and the Network began this joint work in 1995, when they developed a workplace health and safety training, funded by NIEHS. In 1996, LOHP and the Network developed two more train-the-trainer workshops and provided ongoing technical assistance and support to the participating organizations.

Twelve organizations affiliated with the Network (from California, Arizona, New Mexico, Texas and Mexico) participated in the three train-the-trainer workshops conducted by LOHP. The workshops were given in four languages: English, Spanish, Korean, and Chinese. LOHP and the Network worked with the organizations to set up a community-based health and safety program through the volunteer trainers. Each team of trainers from each organization was responsible for carrying out two shorter “informal” trainings and one longer “formal” training. As a result of this grant, 45 multi-lingual, culturally diverse participants were trained in workplace health and safety. They, in turn, trained over 600 people in their workplaces and communities. Through this process, the Network and LOHP developed a model for a successful community-university partnership, based on mutual respect, joint decision-making, open lines of communication and shared resources.

Environmental justice activities are a natural outcome of training and efforts to train. An example, is the following story from LOHP:

In September, 1993, 56 year-old Ramon Romero tried to save a co-worker who had fallen into a tank of toxic sludge at an electroplating shop in Oakland, CA. While his co-worker survived, Romero did not. He left behind a wife and twelve children. Investigators later found that the eight-foot-high tank contained a mixture of sodium cyanide, zinc cyanide, sodium hydroxide, and hydrochloric acid. All of these are common chemicals in the electroplating industry, and all are hazardous. In August, 2000 after a 10-month investigation, the company’s owner, his wife, and a foreman were arrested on charges of involuntary manslaughter in Romero’s death, according to local press reports which also said the company faced a \$741,000 fine by the federal and state Occupational Safety and Health Administrations.

Both Cal/OSHA and the local district attorney's office investigated the incident, and found that nearly all the workers at the facility were Spanish-speaking, and that none of them had ever received health and safety training. This came as no surprise to trainers at UC Berkeley's LOHP. Six months earlier LOHP had contacted the company about NIEHS-funded Spanish-language hazardous waste health and safety training program and the company turned down the offer of low-cost training. It appeared they did not want to release workers for training because production time would be lost.

The Oakland accident spurred LOHP to develop a new outreach program targeting the Northern California electroplating industry. LOHP also wanted to tailor a new hazard awareness training program specifically for workers in this industry, but the program faced several challenges, including the reluctance of employers to agree to worker training, the fact that the industry employs mostly Spanish-speaking workers, and the difficulty many workers have with reading or writing. Since most workers in the industry are unorganized, they also tend to be reluctant to complain about job hazards out of fear for their jobs. Needed was a training approach that was bilingual, that did not depend heavily on reading or writing skills, and that encouraged workers to identify problems and speak out about them.

LOHP developed the training program (which is offered in English or Spanish), and has held ten successful training sessions reaching about 250 electroplating workers.

EPA/NIEHS Coordination of Brownfields and SuperJTI. Under the EPA Brownfields Program and the SuperJTI Program, Office of Environment and Remedial Response and the several Regional EPA offices, NIEHS worked on projects in four locations and Brownfields Minority Worker Training Programs at eleven sites. Showcase Communities coordinators in three locations were involved with the development and implementation of the programs.

Training Reduces Injuries, Illnesses, and Premature Deaths

Workers and businesspeople alike applaud WETP training as dramatically reducing the number of serious injuries, illnesses, premature deaths, and safety violations at workplaces. Nationwide, although the number of hazardous waste and emergency workers has grown sharply, the number of work-related HAZMAT injuries and accidents has remained low, a fact attributed by many to the positive impact of the NIEHS Worker Education and Training Program.

NIEHS maintains a database of successes, outcomes, and lessons learned which tell the stories of how hazardous materials training has saved lives, reduced the numbers of injuries and illnesses at work, helped establish safer and healthier communities, and produced a myriad of other beneficial outcomes. A few are cited below.

Lives Saved. There is clear evidence that NIEHS Hazmat training saves lives:

- *Of approximately 6000 people employed in the New York State Department of Parks and Recreation by 1993, seventy five employees had received confined space training through the Service Employees International Union (SEIU)/Hazmat training program (mandatory for all employees who are likely to encounter confined space work). A further 300 police and emergency responders received 8-hour awareness and hazard communication training. As a result of Hazmat training the department developed a standard operating procedure and an emergency response plan. Further, awareness on a managerial level rose and the department has increased its operational budget and instituted an occupational health monitoring program. The budget increase allowed the purchase of over \$100,000 in equipment, including \$60,000 for confined space work -- a four function air monitor and a new sewage ventilation system. The department has an institutionalized "train the trainer" program. A department manager credits the training program with directly saving the lives of two workers. They were about to enter an enclosed space when they stopped to monitor the air and found the space contained deadly amounts of hydrogen sulfide. There has also been a reduction in Workers' Compensation cases statewide.*
- *Health and safety committee members trained by the United Automobile Workers Union, provided workers a short training on the proper use of respiratory protective equipment in response to worker health complaints. Shortly thereafter, several of these chemical workers were asked to paint an area in their department over a weekend and during an electrical shut-off. A portable tank of compressed air was provided. Because of the training, the workers became suspicious of the quality of this air and requested help to check out their equipment and prevent potential problems. A union health and safety committee member obtained a carbon monoxide monitor to test air quality for this job and determined that the tank of portable compressed air was contaminated with carbon monoxide. The workers did not use the airline, and a potentially deadly accident was prevented. The workers involved believe that without the knowledge they gained from training they would have been poisoned by carbon monoxide while painting and might have died or become seriously injured as a result of this poisoning. One worker stated that extensive training encourages people to be aware of both existing and potential dangers and to prevent accidents, injuries, or an accidental death. Other workers stated that this training saved their lives.*
- *The United Automobile, Aerospace, & Agriculture Implement Workers of America International Union (UAW), conducted Hazardous Materials Emergency Response Training for 1,000 workers and members of the health and safety committee for an auto parts supplier in the northern Midwest. In response to previous worker health complaints, the training included a module on the proper use of respiratory protective equipment. Soon afterward, some of the trained chemical workers went to paint an area in their department. The action would take place over the weekend and during an electrical shut-off. Plant managers presented the workers with a portable tank of compressed air to be used during the task which caused the workers to be suspicious of the air quality. The training these workers received through support from NIEHS teaches workers to request help in checking the equipment and preparing for potential problems. In response, a union health and safety member acquired a new carbon monoxide monitor to test the air quality on the job. The committee member found that the tank of portable compressed air was contaminated with carbon monoxide, and*

stopped the workers from using the air line. The workers believed that the knowledge they received during their training prevented them from being poisoned or even killed in this incident. One worker stated that training encourages people to be aware of both existing and potential dangers.

- *The safety director for the Chicago and N.E. Illinois District Council of the United Brotherhood of Carpenters and its assistant Joint Apprenticeship and Training Committee (JATC) coordinator, recalls that Millwrights Local 1693 received a call from a Chicago chemical plant for a millwright trained in confined space entry. When the name of a third-year apprentice came up as both certified and unemployed, he got the job. On his second day on the job, he arrived to find the safety director monitoring the air at the bottom of the 12'-by-30' reactor. Despite being told the air quality was fine, the apprentice politely refused to enter the space. Worried that the welding from the day before had reduced the oxygen level, he explained that the air at the bottom was not the same as that at the 23' elevation at which he would be working (bolting stairs).*

The safety director reluctantly climbed the reactor, lowered the monitor, and discovered the oxygen had been significantly reduced. The safety director then ventilated the reactor. "After that, they took this apprentice very seriously," says the safety director. "And the company wanted to know how our guy knew this stuff and the men they'd sent for four-hour training somewhere else didn't."

The safety director explained that the UBC's program is heavily hands-on in identifying confined spaces, calibrating and operating monitoring equipment, identifying atmospheric hazards, and using respirators. Hands-on learning occurs, for instance, when two-person teams are lowered into a confined space mockup wearing respirators and have to blank off a pipe connection and make sure everything's okay.

UBC's 16-hour class also includes learning how to conduct rescue operations and prepare permits. "Our people get a feel for what it's like and how the rescue works," says Health and Safety Fund representative, Medlin. "They experience this physically. That's an important part of adult learning, and it makes us much more effective than other courses that might just show you a video."

Fewer Injuries. Fewer people are injured at work because of Hazmat training. Below are some examples:

- *Monitoring for confined space prevented a possible fire or explosion, as reported by a trainee of the California/Arizona Consortium: "A geologist with the city of L.A. (from a 40- hour course) held a half-day meeting with the drilling team management to discuss the need for monitoring and personal protective equipment. As a result of the training, he insisted that respirators be provided in more than one size and that fit testing be conducted. He was also successful in convincing the city that it needed to monitor an area where drilling was conducted before employees could safely work in the area. The monitoring results indicated high levels of methane and the potential for a fire hazard. In sum, his insistence prevented the possibility of a fire or explosion."*
- *A local contractor was awarded a project to install new sewer lines and recondition manholes at a State facility. The project manager, had taken the Laborers-AGC 80-hour Hazardous Waste Worker course. Recalling his training on the hazards of confined spaces from the Hazardous Waste Worker course, he insisted that all of the contractor's personnel be trained in confined space awareness. These workers received the training and the project was successfully completed with no accidents or injuries.*

- *In 1996, the International Association of Fire Fighters (IAFF) presented its Hazardous Materials Training for First Responders (Operations level) course to 90 participants in New York state. The training and emergency response plans that followed may have saved fire fighters from injury. The participants included three municipal fire departments and one federal department. During the training, as part of the curricula, the class of firefighters and paramedics visited the site of a local storage facility for hazardous materials. After the site tour, the class discussed case scenarios and the actions that would be necessary for the first responders. Four days after the IAFF course was completed, a fire began in the chemical facility that the class had visited. All the fire departments that had participated in the IAFF course responded. Afterward, all those that had taken the course agreed that they would have acted differently and the incident would probably have escalated if they had not had the training. The likelihood of fire fighters being injured would have increased, if it had not been for the training.*
- *A hazardous waste site crew working under contract with the EPA was performing cleanup operations at a treatment, storage and disposal facility when a 10 pound container marked "Benzoyl Peroxide" was discovered. As a result of training through the Midwest Consortium, crew members knew that the substance was shock sensitive, took appropriate precautions, and called an explosives disposal team.*

While working on a site where excavation was taking place, a worker who had completed the 40-hour hazardous waste site program with the Midwest Consortium, observed personnel from another company about to enter an unshored trench. Although not in charge of the site, the worker alerted appropriate personnel and others were prevented from going into the trench until the contractor had taken the proper precautions.

While performing clean up at a military site, a worker discovered 400 cylinders containing pentaborane. After consulting reference materials recommended in training classes with the Midwest Consortium, the workers found that the material was once used as a solid rocket fuel and could ignite spontaneously. Special isolation and handling procedures were developed and implemented.

- *Shortly after completing hazardous materials awareness training, provided by the George Meany Center for Labor Studies, a yardmaster approached her railroad management about the need for safer eyewear. At the time of her request, railroad-issued eyewear were plain black frame glasses. The company replaced those safety glasses with glasses with tilt lenses and wraparound sides, and the replacement was none too soon. Shortly thereafter, a fellow rail worker was sprayed with hydrochloric acid. He cause was a gasket which was improperly installed on a tank car. She suffered a bad acid burn and was disfigured. The worker had just received the new safety glasses that had been issued as a result of the post-training request. Without these new glasses, she would have lost her sight. This type of release of a corrosive material from a railroad tank car is quite common. In 1995, corrosive materials accounted for 40 percent of the hazardous materials involved in an accident.*
- *A group of WETP-trained workers used a new air-driven impact wrench to tighten some bolts. Suddenly, without warning, the air hose broke free of its wrench assembly, and started to whip about uncontrollably. A welder in the area, unaware of the situation, was totally unprepared for the impact of the hose end when it hit him full in the face. Fortunately, he was wearing his ANSI approved safety glasses. The welder received a safety award that is presented to all employees that have survived a life-threatening accident as a result of wearing their safety gear. (Story was provided with `promised anonymity)*

Fewer Illnesses. Because Hazmat trained workers know how to protect themselves, fewer workers get exposed and sick, than would otherwise be expected:

- *A rail car inspector, trained by the George Meany Center for Labor Studies explained how training reduces exposure to hazardous chemicals: “Once at an interchange with Michigan Central Railway we were notified about a car. We checked it out via cell phone before leaving. It was an ammonia car. The person who off-loaded it hadn’t tightened the valve. The car was empty but there were still fumes. The students won’t even stop beside the cars now. Before the class there was a leaking chlorine car, some of the guys were overcome by fumes and ended up with burnt throats. It was night, about 3 or 4 a.m., when the fumes hung down. They guys who were injured had been standing around the car talking. The people who were responsible for the car hadn’t had any training and arrived on the scene with no equipment but a wrench...In the past, before training, there was a propylene car on its side. I wondered why the fire department was standing a mile away with binoculars while all our people were standing around the car. Now I know why.”*
- *The California/Arizona Consortium reports that one worker was involved in repainting barrels and inquired whether his symptoms of ill health at the end of the shift might be work related. He felt dizzy and nauseated and coughed up sputum that was the color of the paint being used. After training, the employee requested to see an MSDS and the request was denied. LOHP (part of the consortium) helped, and the company said that the employee could only be seen by a contracted physician. LOHP helped get him to a low-cost occupational health clinic. In response to this employee’s actions, management began a program to conduct on-going air monitoring and implement a respiratory protection program. A year later, this employee was still working painting barrels, but his symptoms subsided and he wears an air purifying respirator. LOHP, jointly with the company and workers, recommended that engineering and administrative controls be investigated to help prevent worker exposure. The company began making steps toward providing a safer work place for its employees.*
- *On a landfill closure project, the workers were told they were to wear level D protection at all times but that they might have to upgrade to level C after hitting a “hot” spot during excavation. The foreman on the project had taken the 80-hour Hazardous Waste Worker course from Laborers-AGC and felt that continuous monitoring should be conducted during excavations operations. He brought his concerns to the project manager and as a result, air monitoring requirements were incorporated while excavating on the project.*
- *Monitoring for confined space can save lives prevents hazardous exposures and related illnesses. A trainee from the Service Employees International Union explained how training had reduced risks: “In one region we had a pump in a lift station. The seals went bad. Before (the Operations Level Confined Space Training) the employees would have jumped in. (Now) they used monitors and figured out the space was filled with toxic substances and waited. (They) ventilated and then monitored and then went in. This guy would have been working in there at low levels or dangerous levels before.”*
- *At a state university project at which PCB and Asbestos were being abated, the shop steward noticed elevated levels of mercury in the sink drains and when the flooring tiles were removed. He felt that the respiratory protection being worn was inadequate or needed changing. He called a hazardous waste instructor from Laborers-AGC to get additional information on mercury and health effects caused by mercury exposure. As a result, the contractor obtained new respirators and cartridges for mercury, and work procedures were revised whenever there was a potential for mercury exposure*

present.

- A rather large-scale PCB cleanup began at a state university as a result of several transformer fires. Upon arrival at the job site, the shop steward and foreman, who had recently completed an 80-hour Hazardous Waste Worker course with the Laborers-AGC, realized that the decontamination procedure planning for the operation was extremely deficient. They conferred with the contractor and the State project manager, and totally revised the decontamination procedure and layout according to the guidelines presented during the 80-hour course. The State was extremely pleased with the revised procedure and continued to follow these recommendations throughout the three-year history of the job.
- *An instructor for the Laborers-AGC had several trainees attending a Hazardous Waste Refresher course tell him that their employers wanted them to wear contaminated protective clothing from their previous shift. The workers made it clear to their employer that they could not wear the protective clothing until it was properly decontaminated and cleaned.*
- *An awardee participant who wished to remain anonymous reported that at a plant employing over 150 union people and 250 to 275 individuals overall, there were at least three major safety and health improvements, and the co-chair of the union safety committee believes that safety and health training helped to accomplish all three: 1) there is better control of asbestos, 2) a non-carcinogenic cleaning fluid was substituted for a carcinogenic substance with no reduction in effectiveness, and 3) people working on gas compressors now monitor for carbon dioxide. As a result, there are fewer lost workdays and medical expenses. Prior to monitoring, two to four people would become sufficiently ill that they would miss 1/2 to 1 1/2 days of work, and in three instances workers required clinic or overnight hospitalization. The monitoring requires approximately 1/2 hour to set up.*

Training Promotes Improved Quality of Working Life.

- *The New England Consortium relates that many sheetmetal workers in the Boston, Massachusetts area had been through training programs covering asbestos, hazardous materials, and indoor pollution, with a MassCOSH instructor. After receiving training, they went to an asbestos removal job at the Federal Building in Boston. After completing the job several of the workers returned to continue training, and they reported some of the issues they confronted in this asbestos case. Their concern was with the “realities” of situations in which they came into contact with hazardous materials. Some of the respirators supplied by the contractor did not work, and the only way they could get functioning respirators was for their union shop steward to continually return to the contractor with complaints of having a “bad” respirator. In another example of on-site problems, the sheetmetal workers were given positively powered respirators, but they were not fit-tested for them. The workers, through training found themselves much more aware of hazardous conditions and potentially dangerous situations, but in becoming more aware they also ran across a whole new set of concerns and issues. Just because they had received Hazmat training did not mean that every work situation they confront will conform to regulation, and how to deal with this on-site became a whole new issue. In this case, going through the union was the solution. The continued training of these workers, including periodic refresher courses, became increasingly important in dealing with many of these ancillary issues.*

WETP Programs Lead to Safer and Healthier Families and Safer and Healthier Communities.

- *A rail worker from the George Meany Center for Labor Studies gave the following example: “We were kept in ignorance, which was detrimental to workers and to the community. When I took the Four-Day Course I was horrified to realize that as a car inspector, I’d walked over corrosive substances that left rocks clean and then worn the same work boots to walk through the house over the carpeting where my baby daughter was learning to crawl. This training is desperately needed, especially in the case of chemical hazards whose effects are not immediate. I was issued work gloves once a month to work on couplings and cars, otherwise I had to buy the gloves. My wife used to wash the gloves in the same washing machine she washed the baby clothes in. Now, new gloves are furnished. I throw ‘em away and get new ones free from the railroad.”*
- *The staff of the California/Arizona Consortium reported that a geologist with the city of Los Angeles. (from a 40 hour course) held a half-day meeting with the drilling team management to discuss the need for monitoring and personal protective equipment. As a result of the training, he insisted that respirators be provided in more than one size and that fit testing be conducted. He was also successful in convincing the city that it needed to monitor an area where drilling was conducted before employees could safely work in the area. The monitoring results indicated high levels of methane and the potential for a fire hazard. In sum, his insistence prevented the possibility of a fire or explosion.*

NIEHS Training Leads to Safer Work Practices

- *A journeyman iron worker and certified welder was conducting repair work on an existing coal silo, when he began to question the chemical make-up of a blue epoxy like substance covering the iron he was welding a zinc coated steel frame to. He asked the supervisor for a MSDS sheet on the substance, but all he was shown was the MSDS’s on the standard job materials (welding rod, acetylene, oxygen, concrete cure, etc.). While there was no MSDS on the blue coating substance, the iron worker was assured by his supervisor that welding or burning on this unknown material would not be hazardous.*

After receiving this assurance and after being told that he was holding up the next concrete pour, the welder went ahead and welded the frame without removing the blue epoxy. During the course of the welding, he began to experience unpleasant odors and smoke under his welding hood, yet continued the job with the supervisor’s assurances of the harmlessness of the substance. Several days later, the iron worker was asked to do some additional welding in the silo itself involving the same unidentified blue epoxy. At this point, he told his supervisor that he would not weld or burn in what he believed to be a confined space without seeing the MSDS. The supervisor had several laborers try to scrape and grind the substance off without respiratory protection, and the welder still refused to work until he had seen the MSDS. When finally supplied with the proper MSDS, the iron worker identified the chemicals toxic notification, the un-usual fire and explosion hazards, respirator recommendation, and the special precautions (especially prolonged breathing of dusts, vapors and the do not weld or flame).

The welder contacted the manufacturer of the substance, Amerthane 135 and 487, and was told that respiratory protection should be worn at all times when welding or burning this product. Nonetheless, the supervisor insisted that if he didn’t do the work, he would get someone else to do it.

After informing his local union representative; a meeting with the contractor, supervisor, business agent, and business manager was held, and the iron worker and a laborer were given a full medical examination, and returned to the job site where they were fitted with and trained in the use of the appropriate respirator. Though there were some additional areas of concern identified by the iron worker, such as proper air monitoring procedures inside the silo, the job was completed per specifications. Thanks to his training under the Iron Worker Apprenticeship and Journeyman Upgrading Fund, this iron worker was able to recognize and question a situation that was potentially harmful to himself and his coworkers.

- *While at work in a chemical plant, a worker saw a 5-gallon glass container of methanol hit the floor and shatter. Due to training with the Midwest Consortium, he followed procedures and notified his supervisor and the plant emergency response team. They quickly determined that the methanol posed an inhalation hazard and the plant employees were evacuated until the airborne concentration fell to a safe level.*
- *As a result of NIEHS-sponsored hazardous materials training by the New Jersey/New York Consortium, a New Jersey State Police trooper was able to resolve, without serious illness, an incident of “Immediately Dangerous to Life or Health (IDLH).” The career trooper in the State Police Bomb Squad, whose team was called to a loading dock, found personnel at the dock and adjacent offices ill due to a trailer of Taiwanese woven baskets. Employees complained of severe eye, ear, and nose irritation and some required emergency hospitalization. The emergency responder recognized the need for immediate evacuation, but says he would not have known to do this had it not been for hazardous materials training. He said that without training he also would not have known that the positioning of the open cargo trailer against the dock constituted a confined space. Because he and his team members had received training, they were able to cooperatively apply proper confined space entry procedures, utilize proper air sampling monitoring procedures, safely don and doff maximum respiratory and chemical protection, employ full decontamination procedures, and activate appropriate procedures for notification of the New Jersey Department of Environmental Protection. The cargo was later found to have been saturated with pesticides and had presented an IDLH situation for the emergency personnel, dock workers, and office workers.*

As a result of training, workers often return to their jobs committed to making their work safer. Armed with knowledge and heightened awareness, trainees often approach management, frequently through joint labor-management safety and health committees, to remedy existing problems:

- *The Midwest Consortium’s Institute of Labor and Industrial Relations at the University of Illinois provided NIEHS-supported training for employees of the Office of Public Works in Springfield, Illinois. A spokesman from the office said that “the training provided... long-term benefits for City Water, Light, and Power. We have found that the trained employees and supervisors are more responsive to hazardous chemical spills. They are more aware of the risks. They tend to take more precautions and ask more questions when working with chemicals.”*
- *Subsequent to a Lockout Train-the-Trainer program provided to New Mather Metals in Toledo, Ohio (UAW Local 12), the company and local union worked jointly to review and revise Lockout procedures for the plant, and identified all energy sources. In addition, an opportunity arose to provide confined spaces training at the same location, and a UAW representative was asked to help the company evaluate a baghouse to determine whether it should be classified as a permit-required confined space.*

A member of Gillete OCAW Local 6409 (now the Paper, Allied-Industrial, Chemical and Energy Workers) in Minnesota reported: The Gillete facility has 300 OCAW members, 600 employees, three shifts, and 300 employees on the day shift. At the Gillete liquid paper plant in St. Paul, there was a plan to transfer mustard oil (allyl iso thiocyanate) from a closed system to a portable one gallon safety can, then carry it into the next room and add this to the missing batch. A spill of even one cup would cause an evacuation of the plant. As a result of training, a worker was able to point out that the MSDS sheet needed to be updated, and that the proper CPC was not being used. The DuPont Tydek product being used was said to be safe by the supervisor, but a call to DuPont revealed that Tydek was only meant for particulates and that in a spill the substance would likely soak into the Tydek. The Supervisor, who was outside the room and was poised to rescue the person inside, had to be trained in emergency response. The people that were to do this were not trained in ER, yet they said they would go in and rescue someone if the person were down. The end result was that management did the procedure while an OCAW employee watched from outside the room. The person outside was instructed not to try to rescue, but to call 911 and to alert the supervisor standing by. Also, all people involved in this procedure were given the MSDS to read and the supervisor explained everything with them. The mustard oil in the plant was put into a closed system. It was safer and it also prevented people from getting high.

- *A crew of trained site workers performing an excavation discovered a group of unlabeled buried drums. Because of training through the Midwest Consortium, there was proper personal protective equipment. The new donned it, inspected the drums, and sampled the drum contents. Laboratory results indicated that the drums contained chemicals and mixtures classified as hazardous wastes.*
- *The New England Consortium training improved safety and health for Massachusetts fire fighters. The local fire department of Ashlyn, Massachusetts found out in the local newspaper that it was the Emergency Response unit for the Nyansa Superfund site, being cleaned up by the Army and EPA. Several Ashlyn fire fighters then took a HAZMAT course through MassCOSH, who felt that it had “bolstered” their confidence in dealing with potential incidents at the Nyansa site. Previous to the training the only monitoring equipment on hand was an explosivity meter that had to be preset to determine what chemical or other material it was coming into contact with. As a result of knowledge gained by Ashlyn fire personnel, the situation at the Baird Macguire Superfund Site was handled differently. Fire fighters of Holbrook, Massachusetts, who were responsible for Emergency Response of the site, were properly informed and trained.*
- *A training recipient of the United Auto Workers program reported a lot of changes since the training that reduced operator exposure to hazardous chemicals. Since the training, senior operators and supervisors took initiative. For example vacuum sampling devices were installed to prevent operators opening up tanks; there was a new condenser, which helped air emissions, and clean up procedures changed drastically. The company made more equipment purchases, revised operations’ procedures job by job, and trained a chemical emergency response team.*
- *A car repairman with 24 years experience on the railroad, from the Transport Workers Union of America, trained at the George Meany Center for Labor Studies explained the difference that training had made: “Before, we used to put ‘doughnuts,’ or seals, on leaking cars. We don’t do it anymore. Now, when the boss says to go out and put a bucket under [a leaking tank car], I say*

“Why don’t you go out and put a bucket under it?” A boss told me to do it a few years ago and I told him I was going to Florida and he’d have to track me down and pay me my salary anyway. You know the old saying: ‘It’s better to be judged by a few than to be carried by six’.”

- A UPIU (now PACE) member who was trained through University of Alabama at Birmingham, from a paper mill in east Texas reported: “Members of our bargaining unit were told to clean out several rail cars so they could be loaded with paper products from our mill. The cars had previously been used to ship rice. They were found to contain some dry chemical packets that, when soaked in liquid, release phosgene gas to kill rats in the rice. Since this chemical was not usually at our mill, we had no MSDS for it. In my UAB/union training, I had been given a NIOSH Pocket Guide and knew how to use it. Because of this, we were able to avoid a potentially serious hazard.”
- *A pulp mill worker from Colorado reported: “Our mill is small, and we don’t get any safety training at all. My local paid for me to come to the first year class, and I took vacation time. Before the class, we used benzene to clean machine felts and equipment, and we pretty much had our hands in it all the time. I found out in the class that benzene is a carcinogen. When I went back I told the guys, ‘We’re not using that stuff any more,’ and we insisted that the company replace it with a less hazardous chemical. They did, and now we are using a much safer cleaner.”*
- *One union reported that training for subcontractors on construction sites is now more frequent, in part because training of union membership led to better site safety plans.*

WETP Promotes Better Training Programs and Better Emergency Response. Two UPIU members trained by the University of Alabama (UAB) trained all 750 employees at the Kimberly-Clark Mill in Childerburg, Alabama. The KC Mill does not have a centralized training structure, and the training is scattered, lacking in many departments, and of poor quality. The union trainers structured their classes to cover basic Awareness Level First Response, and to overlap with other required training such as Hazard Communication and the general information section of MNT-126 hazardous materials handlers training. UAB used materials developed through its NIEHS-supported training award.

There are several examples of training leading to improvements in emergency response:

- *In October 1997, emergency responders, including members of IAFF Local 3647 received First Responder Radiation Training (DOE program). Some weeks later, in December, a truck transporting low-level radioactive materials was found to be leaking in a rural area near Kingman, Arizona. The shipment was in transit from DOE’s Fernald facility in Ohio to DOE’s Nevada Test Site. Fire fighters responded, and, after assessing the situation, notified proper state and federal authorities. According to Linda Mason, State Training Manager for the Arizona Division of Emergency Management: “The IAFF Radiation Program was validated in Kingman, Arizona. Members of the Kingman Fire Department, who attended the program in October 1997, responded to an incident on I-40 in a most effective and efficient manner.” Four other leaks were discovered on 3 other trucks in the following days.*
- *In April 1993 at the String Fellow Acid Pits Superfund Site in Southern California, there was an*

eruption in which overflow from the site covered the surrounding area, including a local road. The first responders, trained by the Southern California Teamsters Hazmat Program, wearing the proper personal protective equipment and respirators, were able to contain and cleanup the site.

- An operating engineer reported: “I worked on a site where we were excavating buried drums and placing them into over-packed containers. We were working in Level B protection with supplied air respiratory protection. We were removing existing drums with a rubber-tired backhoe with a bucket sling. While removing a drum submerged in water we lifted it out and it began smoking severely”. The operator who had both 40-hour training with the IUOE and site-specific training responded by immediately lowering the drum into the hole and covering it with dirt. As a result the release of contaminants which could have caused exposure to workers who were working down wind in Level C protection, which is a lesser level of protection -- Level C protected clothing and respiratory protection was avoided.*
- A man who received training through the University of Alabama at Birmingham program, went afterwards to his company’s vice president asking about an emergency plan, and ended up on a committee to develop an emergency plan for the worksite.*
- A representative of Ford Motor Company wrote to the Midwest Consortium after the Rouge Power House explosion in Detroit. The company noted that “the training provided by Michigan State University enabled us to establish proper procedures for dress out, air monitoring, decontamination, and most importantly, incident command. Each of these components was critical to the success of our commitment to protecting the safety of all personnel who were on scene.”*
- In mid-July 1997, just two weeks after their emergency response refresher training, the members of the Centerville, Iowa Fire Department had a chance to put their training into action. They responded to a leak of peroxyacetic acid in one of the labs at the local hospital. AFSCME’s Training and Education Institute had provided initial awareness and operations level training to the fire and police departments in Centerville in 1996. The fire captain in charge of the response said, “If we had not had the training, we would have just rushed in to deal with the spill just like we used to do.” Instead, they took the time to look up information about the chemical first. From the Emergency Response Guidebook they determined what areas to evacuate, and from the MSDS decided what control measures to take. They selected the proper chemical protective suits and wearing SCBA, diluted the acid to a level that could be handled, then called in a private contractor to clean up and dispose of it properly. The fire department was even able to recover its costs of \$90 from the hospital. Because of their training, the ten fire fighters who responded to the incident approached the spill in an organized manner, then made decisions about the safest way to respond based on information about the product.*

WETP Training Allows for Better Career Opportunities.

Some trainees in construction, who generally do not work Hazmat, become certified and stay certified to keep themselves competitive and able to bid on Hazmat jobs. For others, the training provides not only jobs, but career paths:

- DePaul University worked in Kansas City with the Center for Workplace Education, two Kansas City partners, ERA Environmental and the Full Employment Council (FEC). FEC is a business-led, private non-profit corporation whose mission is to obtain employment for the unemployed and underemployed in Greater Kansas City. FEC accomplishes this goal by working in collaboration on with business, local units of government, educational institutions, and community-based organizations. With the helpful guidance of FEC and*

ERA Environmental, 7 of the trainees formed a partnership and incorporated their own company and are now legally known as the Brownfield Environmental Group, LLC. They have completed their first local contract and are looking to bid on other environmental jobs. They keep their income flow consistent, the graduates who comprise the group are also employed by environmental contractors such as ERA. These graduates are well on their way as entrepreneurs in the environmental remediation field.

Capacity Building is a Key to WETP Success.

Examples of capacity building abound -- some institutional, some personal, and some community.

Institutional Capacity Building. More than 90 institutions, serving the needs of workers in hazardous materials training, have increased their capacity to train. They have also increased the capacity of others to train.

In 1999, NIEHS awarded HMTRI \$50,000 in supplemental funding to support two six-day Brownfields Train-the-Trainer Institutes. HMTRI, with access to a broad array of colleges through its work with EPA OSWER and through the Partnership for Environmental Technology Education (PETE), has run institutes to develop the environmental, health and safety instructional capability of colleges serving EPA Brownfields Pilot Communities, National Priorities List (NPL) sites, and SuperJTI sites.

Paper, Allied-Industrial Chemical and Energy Workers International Union (PACE). The Paper, Allied-Industrial Chemical and Energy Workers International Union (PACE) developed a powerful program for fundamental improvement in plant safety performance: the PACE Triangle of Prevention (TOP) Program. The TOP Program is designed to go beyond the achievements of current industry initiatives or government regulations. Its goal is to maximize prevention, not intervention. The motivation behind it is the health and safety of their members and our communities, and the preservation of their industry. PACE's TOP Program is comprised of three interdependent elements:

- A new method for measuring the success of a facility's health and safety systems;
- A PACE System of Safety and Incident Investigation training program;
- A full-time union health safety representative program.

The TOP Index improves upon the OSHA 200 Log, which assumes that an injury-free workplace is a safe workplace. We recognize that a low OSHA injury recordable rate, while laudable, does not effectively measure true safety and health. In a great majority of serious accidents, incidents and near-misses, there are no OSHA recordable injuries. And many deadly incidents occur at facilities with previous histories of extremely low OSHA rates.

The TOP Program, with the support of industry, revolutionizes the measurement of safety through a

positive, comprehensive index of safety systems. The TOP Program includes the OSHA-recordable injuries as well as tracking fires, explosions, chemical spills, emergency responses, nip-point injuries, compromised structural integrity in vessels and tanks, and injuries to contractors and the public. But most importantly it tracks and measures constructive, positive changes in the workplace. Unlike any system we know of, it measures and gives credit for each correction to flawed Systems of Safety.

In this way, the TOP Index taps into basic human nature: what you measure is what you pay attention to; what you pay attention to is what you fix. Fixing the underlying root causes of accidents, incidents and near-misses will cause the index to improve. Improving the index means improving the Systems of Safety at work.

The California-Arizona Consortium. The California-Arizona Consortium works with Maquiladora Associations in San Luis and Nogales, Sonora, Mexico on pollution prevention studies. Maquiladoras are committing to be in the study and pollution prevention seminars are being planned.

The New England Consortium (TNEC). In 1987, when NIEHS awarded its first health and safety training awards, one of them went to the University of Lowell's fledging graduate-level academic and research program in occupational health and safety. The award was one of the earliest to the new Department of Work Environment and it established a worker training organization, TNEC, in partnership with state-based Coalitions for Occupational Safety and Health.

Thirteen years later, the consortium, still based in the University of Lowell Worker Environment Program (WEP), operates under its fourth consecutive Superfund award. The department around it has grown in many directions and TNEC is now only one of a constellation of projects, which target particular occupational and environmental health needs and worker populations.

WEP opened the Lowell Center for Sustainable Production (LCSP) to foster economic activity that conserves natural resources; protects workers' and communities' health; is non-polluting; and economically efficient. The LCSP seeks to demonstrate the compatibility of such an approach with new systems of production. In a related area, the WEP now offers a master's and doctoral concentration in Cleaner Production and Pollution Prevention, which integrates economic performance, sound environmental policy, and safeguards for worker and public health. This concentration is thought to be the only program of its kind in the country.

Massachusetts' Lowell-based Toxics Use Reduction Institute (TURI) is now ten years old and is a recognized resource in dealing with chemical hazards to prevent hazardous waste at the source. Its newly released appraisal of the state TUR program shows that Massachusetts industries have reduced their level of toxic wastes by 30 percent and their level of toxic chemical usage by 20 percent -- significantly more than national averages -- since the beginning of the TUR effort. TURI,

led by Dr. Ken Geiser, has trained more than 1200 professionals in the state to incorporate TUR approaches in industrial planning. TURI also provides technical aid to industry, awards TUR-focused research grants, and operates a Surface Cleaning Lab available to industry.

Other Programs Emanating from the Program at UMass-Lowell. The Lorin E. Kerr Ergonomics Institute for Occupational Injury Prevention (KEI) at the University of Massachusetts Lowell (lead organization for TNEC) is the northeast region's only comprehensive academically based research center for the study of occupational injuries and ergonomic risks, and aims to promote preventive strategies in industrial and public policy. Research has ranged from inquires into the ergonomic risks to loggers in Maine to studies of meatpackers and supermarket checkers.

At Malden Mills, a large fire in December 1995 destroyed a large portion of the textile plant and injured nearly 3 dozen workers. Since this incident, a program has been developed to promote a "safety first" culture at the textile plant. This is a collaborative effort between management, union, and academia. Dr. Margaret M. Quinn and Craig Slatin of TNEC are leading the project, which will conduct hazard assessments, health and safety training and establish joint health and safety committees.

The Construction Occupational Health Project (COHP), begun five years ago, works to identify and prevent construction workers' health hazards on the biggest public construction project in the country: the \$8-billion Central Artery/Third Harbor Tunnel project in Boston. Among other things, COHP personnel are quantifying health risks, such as work-related musculo-skeletal disorders; pulmonary disease resulting from exposure to silica, dust, and diesel fumes; and noise related hearing loss. The research is prevention-oriented and takes an integrated approach.

The Work Environment Justice Fund at Lowell was established under an innovative court settlement of workplace health violations. So far, the fund has distributed \$270,000 to grassroots organizations to improve workplace health for minority, immigrant, and low-wage workers in Massachusetts. The fund's administrative committee are all WEP faculty. Many of the projects the fund supports aim to educate and train workers in health and safety on the job. Another \$100,000 in awards will be distributed this September in a competitive process.

The WETP's reach is international and recently, Work Environment was named a World Health Organization Collaborating Center in Occupational Health for a four-year period. The designation was linked, in part, to a working agreement between Work Environment and the Universidad Michoacana de San Nicholas de Hidalgo in Moralia, Mexico, under which the department offers graduate work and collaborative research opportunities to Mexican professionals and helps mount joint international seminars and conferences.

Environmental Technology Program, International Union of Operating Engineers (IUOE). The Federal Government spends considerable time and money to develop innovative environmental

technologies. These new technologies, used at DOE sites and/or Focus Area projects or large-scale demonstrations, often prove to be better, faster, safer, and cheaper than current methods. Health and safety issues associated with these new technologies, however, can slow down or stop a project, wasting limited time and resources. The Human Factors Assessment of Environmental Technologies Program is the first such program to focus specifically on the human factors and potential worker- and public-safety hazards posed by these innovative technologies in the hazardous waste cleanup industry. In 1996, Frank Hanley, General President, IUOE, announced an agreement that formed this program.

The Human Factors Assessment of Environmental Technologies Program:

- Assists DOE EM-50 in the development and deployment of new and innovative technologies.
- Tests and assesses new technologies in the hazardous waste cleanup industry.
- Works with technology developers to identify, eliminate, or mitigate human factors problems and safety hazards in the early stages of development.
- Assists developers in effective deployment of their technologies to the end-user.

The program objectives are:

- To facilitate the deployment of DOE EM-50 technologies by working with the developers to eliminate/mitigate hazards and operational hindrances.
- To assist developers in providing structured information to technology user to aid transition from development to deployment.

The UAW, under a grant from NIEHS, trained a newly formed joint health and safety committee in Hazardous Materials Awareness and Confined Space Entry at a plumbing parts manufacturing facility in the Midwest. Following the training, committee members initiated much needed changes in the management and storage of chemicals. For instance, containers were purchased to carry chemicals unloaded from trucks to a storage area. Committee members identified hazardous chemical storage areas, posted signs and organized and labeled materials, both in the foundry and in the main plant. They sorted and labeled containers of hazardous waste. Waste streams were identified, a chart was developed to track waste and signs were posted to coordinate with the chart. Salaried and hourly health and safety committee members attributed their accomplishments to their greater awareness and knowledge from training. Before they made these changes, employees said the committee “reacted to problems rather than prevented them.” By addressing the need for common management techniques, the facility reduced the likelihood of injury in the case of a spill or other occurrence. The UAW training began a process of significant health and safety improvements and prevention of health and safety problems.

Building Corporate Capacity for Safety and Health, Hazardous Materials Training & Research Institute (HMTRI). Cargill, Inc. operates five plants in Eddyville, Iowa, which produce corn milling by-products, including ethanol and citric acid. The company employs 350 people, of which 41

technicians have received HMTRI/Kirkwood Community College's 24-hour Hazmat course, with an additional 95 percent of the employees receiving a two-hour Hazmat awareness class through another program. A Cargill official rated the Kirkwood program very highly, and said that the greatest benefit of the program was that it facilitated development of an emergency response program at Cargill specifically tailored to chemical emergencies. Prior to the training, Cargill was forced to rely on an outside emergency response team from a local fire department, which in an emergency, could result in delays of up to an hour. Since workers have received Hazmat training, the company now responds to these incidents internally, and there is an established response system in place. Also as a result of its involvement in training Cargill purchased an additional \$25,000 in equipment, including level A and B suits and a vehicle. Further, Cargill has recently decided to make additional training available for its workers, focusing on respirators and confined space.

Environmental Justice, Clark Atlanta University. In 1996, the Environmental Justice Resource Center at Clark Atlanta University produced a report, "Environmental Justice and Transportation: Building Model Partnerships." The Environmental Justice Resource Center at Clark Atlanta University assembles an annual guide entitled "People of Color Healthy and Sustainable Communities Directory." The guide identifies individuals of color that are working on environmental justice, pollution prevention, health, housing, energy, sustainable technologies, transportation, land use, community development, neighborhood revitalization, empowerment and enterprise zones, sustainable agriculture and communal gardens, and related areas.

Personal Capacity Building. All parties involved in the WETP program from administrative and professional staff to peer-trainers and especially those having received training, have experienced a great deal of personal development and growth.

For professional staff associated with WETP, there are semi-annual awardee meetings and technical workshops. For peer trainers, there are national trainers' exchanges, educational seminars, and sometimes college degree programs. For those trained, there is often an initial awareness of safety and health that leads to further training. Training for program participants provides a unique set of skills, empowerment, and greater employability. This is especially true for those in the Minority Worker Training Program.

One trainee wrote:

Martanaze Hancock: "This training that I received at the Alice Hamilton Center under the MWTP has tremendously changed my life for the better. In 1992, I was a high school drop out without a future. I was the father of 2 small children without a decent way of earning a living. I soon landed in juvenile prison where, through counseling sessions, I realized that I needed to change my life. I returned to school to obtain a diploma and within a year I completed enough courses to graduate from the Washington Dix Street Academy with a high school diploma. I possessed the drive and desire but not the tools or skills to gain meaningful employment. While I was working as

an underpaid janitor, I heard of the MWTP. It was exciting to learn so much about occupational safety and environmental hazards, which made staying focused surprisingly easy. I was named the distinguished graduate. I quickly found employment with an asbestos abatement company as a worker. I maintained employment as a worker for about a year and was soon promoted to foreman. After another year I was offered and accepted the position of Instructor's Assistant at the Alice Hamilton Center. As of 2000 I am an accredited instructor and I am very involved with the MWTP. I am very pleased to be given the opportunity to help participants learn more about environmental and occupational safety. I am even more pleased to be involved in a program that helps people improve their lives."

From a trainee of the Center to Protect Workers' Rights program, operating with OIC:

"I now thank OICW for helping me get my life back in order. I am no longer a problem to society. I can be a productive member to society. In my past years I was a drug addict in and out of jail but now I have job skills and certificates to show for all the hard work I've done, This is the first time that I have completed something in my life and I feel great. OICW -- it works."

Another trainee from a program of the Center to Protect Workers' Rights, said:

"My experience with the B.P. was very good. When I started the pre-apprenticeship program, I was without work and my family situation had a sad future because I have five children and no economic support for my family. They helped me to find a part time job during my school. I needed to go to school every day, worked as a volunteer for Habitat for Humanity and every night went to work until 2:00 a.m. and was ready for the next day at 8:00 a.m. for the school. At last I finished my training, and the next week I started to work for CBC with a salary of \$10.69/hr. I have an opportunity to continue my education. I'm going to the school every two weeks and I know when I finish my 52 blocks of classes (approximately 2 years) I'll be able to apply for a journeyman position, at twice my current salary. I'm very thankful to the BP because I know that they worked with me giving me good advice and they continually support me to finish my training."

Community Capacity Building. Training across the United States vastly improves community capacity building especially their ability to respond to emergencies either through the efforts of the IAFF's emergency response training or the training of collateral duty personnel or workers who often participate as volunteers in local firefighting departments. Further, the education of local public officials has led to an increased awareness and the application of this new found awareness to issues directly affecting the environmental safety and health of communities. It is also important to note that the education of members of the community either through MWTP, Brownfields training, SuperJTI, or traditional hazardous materials training provided by the construction or industrial trades, community occupational safety and health groups, or university consortia, helps develop a broader overall awareness of environmental safety and health concerns and leads increased community involvement in remediation efforts, employment opportunities, etc. Many trainees bring their knowledge and skills to their volunteer fire department work. Many also bring their

knowledge to community activism, such as work to clean up streams and forest land.

Below are some specific examples:

- *The Head Trainer at Midwest Center for Occupational Health and Safety working through the AFSCME Training & Education Institute reported that he had completed approximately 1/3 of the fire fighters training course for the Duluth Fire Department when he went home for the evening. Attempting to return the next day he found the city sealed off and evacuated. The other instructor, Keith Carlson, had taken charge as the on-site supervisor, while Duluth Fire Dept. with the air monitoring training equipment of the training program became the emergency response team. As a result of this incident Duluth decided to use the Hazmat training program with employees in units of the Department of Water and Gas. An AFSCME official said that the municipalities like the Hazmat program, and that training in this area would be impossible without government financial support. The introduction of these HAZMAT programs has also provided an introduction to various public and private sector officials to the need for other training programs; e.g., hazard communications.*
- *Training provided by the International Association of Firefighters (IAFF) created an environment where firefighters, fire administration, and city officials could meet and participate in a setting to resolve concerns related to an EPA-Superfund site in New Hampshire. IAFF presented "Training for Hazardous Materials Response: Chemical Process Industry" to the Dover New Hampshire fire department in late summer 1996. Prior to the class, there was considerable concern, even mistrust, between the fire fighters and members of the City Council and Public Works. There was a critical lack of knowledge by some fire personnel regarding federal regulations related to hazardous materials and Superfund. IAFF presented its course over several weeks to ensure that all shifts of firefighters were able to attend. In addition to the firefighters, the entire group of fire staff administration, and four of 9 city council members attended the class. The council members included the mayor pro-tem, and 2 other members. The hosting local wrote to the IAFF, "In talking to those in attendance, no one can remember when members of labor, fire department administration, and city officials were all in the same room in a friendly, mutually participatory environment where we all were listening and learning from each other."*

WETP Leads in Administrative Excellence

Peer Review of Grant Applications. Upon receipt, grant applications and supporting material are examined for completeness by the Center for Scientific Review, of the National Institute of Health. In addition, the Division of Extramural Research and Training (DERT) within NIEHS does an administrative review for completeness and responsiveness to the RFA. Incomplete applications are returned to the applicant without further consideration. The specific points of consideration are the appropriateness of the training plan proposed in regard to the mission of the NIEHS and the WETP and the general completeness of the application including responsiveness to programmatic requirements and the organizational adequacy for review (including scientific, technical, and budgetary considerations.)

Evaluation of completed applications for scientific and technical merit is done by an appropriate peer review group convened by NIEHS in accordance with the review criteria. The committee is usually composed primarily of non-government members with expertise in occupational health and safety training related to hazardous materials, waste operations and emergency response.

As part of the initial merit review, all applications receive a written critique and undergo a review in which only those applications deemed to have the highest scientific merit are discussed, assigned a priority score based on the technical merit of the overall application, and receive a second level review by the National Advisory Environmental Health Sciences (NAEHS) Council.

Monitoring for Program Quality. The NIEHS staff maintains close contact with each of the principal investigators of individual training programs. Regular program meetings of all awardees are convened periodically to insure coordination of training efforts, sharing of information and insights, and adherence to NIH grants management policies. Regular progress reports detailing financial expenditures and program accomplishments must be submitted and are reviewed before annual continuation funding is approved by NIEHS staff.

Employers Have Confidence in the Program. Businesspeople, academics, and policy makers credit the program with minimizing the number of fatalities, injuries, illnesses, and accidents that would otherwise have accompanied the nationwide increase in Hazmat work and traffic.

The Principal Vice President and Manager of Corporate Environmental, Safety and Health Services at Bechtel said:

“NIEHS provides excellent training resources to enhance worker knowledge of safety and health. Employees who have utilized the training under the NIEHS program seem to be safer workers. They understand why contractors are requiring them to work safely. And they share the benefits of that training with their co-workers who have not received that training... For Bechtel and other safety-conscious contractors, the benefits of employing NIEHS-trained employees show up in lower accident rates and reduced workers’ compensation premiums. Those in turn provide contractors a better opportunity to win bids against contractors who have chosen not to utilize NIEHS training programs.”

Because of established expertise and effectiveness in hazardous materials training, there are an increasing number of examples, where employers have come to awardees and asked them to come in and help with hazards and/or training.

In Detroit, the Detroit Water and Sewerage Department sought out the help of the UAW. The Detroit Water and Sewerage Department (DWSD) wastewater treatment facility is one of the largest water treatment facilities in the U.S. Recently, Michigan OSHA cited the facility for a number of Hazwoper and Lockout-related violations. The city of Detroit asked the UAW Health and Safety Department for assistance to abate the citations, as well as to provide expertise in planning for emergencies. UAW Locals 2342 and 2334 represent approximately 100 workers at the facility. Since the request for assistance, the UAW provided emergency response, Operations Level training to 33 employees, with a commitment from the city of Detroit to train over 100 DWSD employees over the following year. A walkthrough of the facility was conducted for the purpose of identifying

Lockout concerns to be highlighted in a site-specific Lockout training program.

Through the Midwest Consortium, Michigan State University provided training at Ford Motor Company following the Rouge Power House explosion in Detroit. A company representative wrote: “The training provided by Michigan State University enabled us to establish proper procedures for dress out, air monitoring, decontamination, and most importantly, incident command. Each of these components was critical to the success of our commitment to protecting the safety of all personnel who were on scene.”

Appendix 1

Current WETP Awardees

American Federation of State, County, and Municipal Employees (AFSCME)

Sub-awardees:

- Coalition of Black Trade Unionists
- University of Massachusetts, Lowell

California/Arizona Consortium (CAC)

Sub-awardees:

- University of California, Los Angeles, Labor Occupational Safety and Health Program (LOSH), Lead Agency
- Alaska Health Project
- Arizona State University
- University of California-Berkeley, Labor Occupational Health Program (LOHP)
- University of California at Davis, University Extension

The Center to Protect Workers’ Rights (CPWR)

Sub-awardees:

- Colorado People’s Economic and Environmental Network (COPEEN)
- International Association of Heat & Frost Insulators
- International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers, Helpers
- International Brotherhood of Electrical Workers
- International Training Institute for the Sheet Metal and Air Conditioning Industry
- International Union of Bricklayers and Allied Craftworkers
- International Union of Painters and Allied Trades Joint Apprenticeship and Training Fund
- Louisiana Regional Council of Carpenters
- Los Angeles Conservation Corporations
- Merrick Community Services
- National Iron Workers and Employers Apprenticeship Training and Journeyman Upgrading Fund
- Oakland Private Industry Council, Cypress Mandela/WIST Training Center Opportunities Industrialization Center

West

- Operative Plasterers' and Cement Masons' International Association of the United States and Canada
 - Salt Lake Community College
 - United Association of Journeymen & Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada
 - United Brotherhood of Carpenters Health and Safety Fund of North America
 - United Union of Roofers, Waterproofers and Allied Workers / Alice Hamilton Occupational Health Center
- **DePaul University**

Sub-awardees:

- Alice Hamilton Occupational Health Center
- Adult Learning Systems Division / McVey & Associates, Inc
- ERA Environmental and Safety, Inc.
- Maine Labor Group on Health

George Meany Center for Labor Studies (GMC)

Sub-awardees:

- AFL-CIO Department of Occupational Safety & Health
- AFL-CIO Transportation Trades Department
- Brotherhood of Locomotive Engineers (BLE)
- Brotherhood of Maintenance of Way Employees (BMWE)
- Brotherhood of Railroad Signalmen (BRS)
- International Chemical Workers Union Council's Center for Worker Health and Safety Education (ICWU)
- National Conference of Firemen and Oilers, SEIU
- Transportation/Communications International Union (TCU)
- Transport Workers Union of America (TWU)
- United Transportation Union (UTU)

Hazardous Materials Training and Research Institute (HMTRI)

Sub-awardees:

- Community College Consortium for Health and Safety Training (CCCHST)

International Association of Fire Fighters (IAFF)

International Chemical Workers Union Council (ICWU)

Sub-awardees:

- American Federation of Teachers (AFT)
- American Flint Glass Workers Union (AFGWU)
- Coalition of Black Trade Unionists
- Greater Cincinnati Occupational Health Center
- International Association of Machinists and Aerospace Workers Union (IAM)
- International Chemical Workers Union (ICWU)
- United Food and Commercial Workers International Union (UFCWU)
- United Steelworkers of America (USWA)
- University of Cincinnati

- USWA Aluminum, Brick and Glass Workers District
- USWA Rubber, Plastics Industrial Conference

International Union of Operating Engineers

International Union, United Auto Workers (UAW)

Sub-awardees:

- University of Michigan, Ann Arbor

Laborers/Associated General Contractors Education and Training Fund (Laborers-AGC)

Sub-awardees:

- Detroit Works Partnership
- Greater Dwight Development Corporation
- International Brotherhood of Teamsters (IBT)
- Laborers' District Council of Philadelphia
- Laborers' Joint Training Fund of Washington, D.C.
- Make Ready, Inc.
- University of Massachusetts Lowell
- Young Community Developers

Midwest Consortium for Hazardous Waste Workers Training

Sub-awardees:

- Citizens for Environmental Alliance
- Detroiters Worker for Environmental Justice
- Fisk University - Environmental Justice Program
- Greater Cincinnati Occupational Health Center
- Indiana University
- Lakeshore Technical College
- Michigan State University
- Ohio Environmental Council
- Southeast Michigan Coalition on Occupational Safety and Health
- The Three Affiliated Tribes
- University of Illinois
- University of Kentucky
- University of Louisville
- University of Minnesota
- University of Tennessee

New England Consortium

Sub-awardees:

- Connecticut Council on Occupational Safety and Health (CCOSH)
- Massachusetts Coalition for Occupational Safety and Health (MCOSH)
- New Hampshire Coalition for Occupational Safety and Health (NHCOSH)
- Rhode Island Committee for Occupational Safety and Health (RICOSH)
- University of Massachusetts Lowell

- Western Massachusetts Coalition for Occupational Safety and Health (WMCOSH)

New Jersey/New York Hazardous Materials Worker Training Center

Sub-awardees:

- Community Environmental Center
- Glen Cove Youth Board
- Hunter College, School of Health Sciences
- Ironbound Community Corporation
- La Casa de Don Pedro
- Lower Washington Heights Neighborhood Association
- New Jersey State Police
- New York Carpenters Labor Technical College
- New York City Environmental Justice Alliance
- Magnolia Tree Earth Center
- New York Committee for Occupational Safety and Health
- St. James AME Church (Newark, NJ)
- The Valley (MWT); Project Harmony
- University at Buffalo
- University of Medicine & Dentistry of New Jersey
- We Stay/Nos Quedamos

Paper, Allied Industrial, Chemical and Energy Workers International Union (PACE) (formerly Oil, Chemical, and Atomic Workers International Union)

Sub-awardees:

- The Labor Institute, New York
- New Perspectives Consulting Group
- University of Alabama Birmingham
- University of Massachusetts, Lowell

Service Employees International Union

Sub-awardees:

- New York Committee for Occupational Safety and Health (NYCOSH)

University of Alabama at Birmingham (UAB)

Sub-awardees:

- Communications Workers of America (CWA)
- Native Americans Fish and Wildlife Society

Xavier University of Louisiana

Sub-awardees:

- Center to Protect Workers' Rights (CPWR)
- Clark Atlanta University (CAU)

- Laborers-AGC Training Fund - North Baton Rouge Environmental Association
- North Georgia Building Trades
- Southern University in Baton Rouge
- Southern University in Shreveport-Bossier City

Source:

National Institute of Environmental Health Sciences, Worker Training Grants, “List of Worker Training Awardees,” <http://www.niehs.nih.gov/wetp/grant/list.htm>, April 11, 2001.

Appendix 2

NIEHS WORKER EDUCATION AND TRAINING PROGRAM LIST OF TRAINING COURSES
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COURSENU	COURSE NAME	PROGRAM
100	CERCLA CLEANUP	
101	Basic Superfund Site Worker	Applies to all programs
102	Site Worker Refresher	
103	Site Worker Train-the-Trainer	
104	Site Supervisor Basic	
105	Site Supervisor Refresher	
106	Underground Storage Tank Basic Worker	
107	Master Instructor Refresher	
108	Oil Spill Response	
109	Hazardous Waste Site Basic Inspector	
110	Hazardous Waste Site Inspector/Awareness	
111	Final Rule (Hazardous Waste Operations) Awareness	
112	General Hazardous Waste Train-the-Trainer	
113	Hazardous Waste Operations	
114	Hazmat Training for Infectious Diseases 1	
115	Hazardous Materials Chemistry	
200	RCRA/INDUSTRIAL	
201	RCRA TSD Site Worker	Applies to all programs
202	RCRA TSD Site Supervisor	
203	RCRA TSD Site Refresher	
204	Basic Industrial Emergency Responder Operations	
205	Industrial Emergency Response Awareness 2	
206	RCRA Site Train-the-Trainer	
207	Industrial Emergency Responder Technician	
208	Industrial Emergency Responder Specialist	
209	Process Safety Management	

210	Pollution Prevention	
211	Hazardous Waste Characterization	
212	Fire Watch	
300	EMERGENCY RESPONSE	
301	Emergency Response Refresher	Applies to all programs
302	Emergency Responder Basic Operations	
303	Emergency Responder/Hazmat Technician	
304	Emergency Response Awareness	
305	Emergency Response Train-the-Trainer	
306	Emergency Response Incident Command	
307	Emergency Response Hazardous Materials Specialist	
308	Emergency Medical Basic/Advanced	
309	Emergency Response for Specific Hazards	
310	Hospital Emergency Room Operations	
311	Awareness of Radiation Hazards for Emergency Response	
312	CAMEO	
400	RADIATION	Applies to all programs
401	Radiation Protection Worker/Basic	
402	Radiation Worker II Training	
403	Radiation Worker Refresher	
404	Nuclear Power Plant	
500	LEAD ABATEMENT³	
501	Lead Abatement Worker Basic	Applies to DOE/DOE-M/DOE-EM/DOE-NE/DOE-OE/DOE-OST/DOE-SC/DOE-SS/DOE-T/DOE-TE/DOE-VE/DOE-VT
502	Lead Awareness	
503	Lead Abatement Instructor	
504	Lead Abatement Worker Refresher	

505	Lead Abatement Supervisor Refresher	
506	Lead Inspector Certification	
507	Lead Abatement Supervisor	
600	ASBESTOS ABATEMENT3	
601	Asbestos Abatement Worker Basic	Applies to:DOEMMWTBMWT
602	Asbestos Abatement Worker Refresher	
603	Asbestos Abatement Supervisor	
604	Asbestos Abatement Supervisor Refresher	
605	Asbestos Operation & Maintenance Refresher	
606	Asbestos Control Refresher	
607	Asbestos Inspector Refresher	
608	Asbestos Handler Refresher	
609	Asbestos Control Certification	
610	Asbestos Inspector Certification	
611	Asbestos Management Planner	
612	Asbestos Awareness	
700	HAZMAT TRANSPORT	
701	Hazmat Transporter Basic Hazardous Materials	Applies to all programs
702	Transportation Awareness	
800	EDUCATIONAL ENHANCEMENT	
801	Basic Construction Skills	Applies to:MWTBMWT
802	Basic Welding Skills	
803	Basic Electrical Training	
804	Basic Math Skills	
805	Basic Reading/Writing Skills	
806	Basic Science Skills	
807	Basic First Aid	
808	Adult CPR	

809	Physical Fitness	
810	Mentoring/Career Guidance	
811	GED Training and Certification	
812	Life Skills	
813	Environmental Sampling	
814	Environmental Justice	
815	Environmental Technician	
816	Computer Skills	
817	Business Communications	
818	IBT Apprenticeship Training	
900	MISCELLANEOUS	
901	Confined Space	Applies to all programs
902	Cutting & Burning	
903	Environmental Preparation	
904	General Industry Safety 4	
905	General Construction Safety 4	
906	Evaluation of Industrial Ventilation	
907	Scaffold	
908	Respiratory Protection	DOE
909	Ergonomics	DOE
910	Lockout/Tagout	All Programs
911	Hearing Conservation	DOE
912	Fall Protection	DOE

913	Hazard Com
914	Tunnel Rigging
915	Rigging
916	Advanced
918	Training
919	Micro
1 Course Number 114 includes "Bloodborne Pathogens & Health Care Workers Training"	
2 Course Number 205 includes "Hazardous Waste Awareness"	
3 Under the EPA HWWT Program, all lead and asbestos training courses need prior approval	
4 Course Numbers 904 & 905 include OSHA 10 and OSHA 500	

Source:

National Institute of Environmental Health Sciences, "List of Training Courses,"
<http://www.niehs.nih.gov/wetp/awardee/courses.htm>, April 11, 2001.

